United States Court of Appeals

for the Second Circuit

EXHIBITS

B

76-7207

United States Court of Appeals

For the Second Circuit

Docket No. 76-7207

PRUDENTIAL OIL CORPORATION,

Plaintiff-Appellee,

vs.

PHILLIPS PETROLEUM COMPANY,

Defendant-Appellant.

ON APPEAL FROM THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

(67 Civ. 3748 (C.L.B.))

EXHIBITS FOR JOINT APPENDIX

Volume II — E323 - E627

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UNITED STATES COURT OF APPEALS
FILED
SEP 2 1976
A. DANIEL FUSARO, CLERK
SECOND CIRCUIT

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J-43, Letter, Learned to Durand,

December 16, 1963

PHILLIPS PETROLEUM COMPANY

BARTLESVILLE, OKLAHOMA

E 323

December 16, 1963

STANLEY LEARNED
PRESIDENT

Mr. Rafael Durand, Administrator
Economic Development Administration
Commonwealth of Puerto Rico
San Juan, Puerto Rico

Chemical Manufacturing Facilities
in Puerto Rico

Dear Mr. Durand:

We have been analyzing Puerto Rico's potential in the manufacture of chemical products for world marketing with several members of your organization and our own International Department and Executive Department officials. We now propose a project which can provide benefits to Puerto Rico, the Continental United States, and Phillips Petroleum Company.

The basis of the proposed operation is through a unique combination of resources to provide maximum petrochemical yields in Puerto Rico and yields of by-product motor fuels not to exceed 50 per cent of the feed stock used. In addition it is planned to encourage maximum participation in the project by Puerto Rico capital.

The most important consideration developed from our studies is that a core chemical manufacturing plant charging 50,000 barrels per day of carefully selected hydrocarbon fractions offers a potential for an eventual sound investment of $300,000,000 to $500,000,000 in a series of plants necessary to convert the raw materials to consumer goods. Such an investment will give employment to many thousands of people in direct and affiliated operations. In addition, large numbers of people will have to be employed in development of community housing and support services.

The potential for development of new products, services and employment with the establishment of this basic industry is limited only by our joint efforts to develop markets. Our confidence in the future of this industry in Puerto Rico is such that

we are willing and able to make an initial investment of $45,000,000 in basic petrochemical facilities. In addition we will place all of the technical and marketing capabilities of Phillips Petroleum Company in support of efforts to develop additional investment by ourselves and our customers. After this initial stage the project itself should offer so many benefits to Puerto Rico and its customers that it will generate on its own the funds required for continuing development.

Our decision to make this major initial commitment in Puerto Rico is based largely on our confidence in the continued support of Puerto Rico's manpower, financial and material resources. Certainly the major incentives offered through the Economic Development Administration for encouragement of new industries have had a major bearing on our decision to make such investment.

We recognize that substantial quantities of chemical materials will be produced which cannot currently be consumed within Puerto Rico. Accordingly, we are prepared to apply the efforts of our worldwide marketing organization toward the successful sale of these chemical products.

Summarizing the results of our work, Phillips can provide the following unique combination of advantages for this project:

1 - Supply of select hydrocarbon fractions, all of which are suitable for chemical manufacture, rather than a supply of crude oil as feedstock.

2 - Use of Phillips' proven technical knowledge and experience in petrochemical manufacture.

3 - Use of Phillips' worldwide petrochemical marketing organization to help to establish markets for all products in excess of the internal requirements of Puerto Rico.

Immediately after a quota for Phillips Petroleum Company to import 50,000 barrels per day of select hydrocarbon fractions to Puerto Rico can be obtained, we are ready to implement this project.

As indicated, our initial investment in petrochemical facilities will be $45,000,000. Our present market forecasts indicate that within 5 or 6 years after the operation is on stream there will be a demand for products to support an expansion of the facilities to a gross investment in excess of $100,000,000.

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We are attaching an economic analysis and a schedule of operating results for the proposed complex. In addition, a summary of products to be produced and a partial listing of possible satellite companies which will be interested in a new source of materials in the Caribbean is provided. Supporting these addenda are extensive confidential Phillips' surveys and reports concerning economic, operating, financial, engineering, organization and research considerations. These are available to you as required.

This project will provide substantial benefits and a means for Puerto Rico to participate prominently in world chemical markets. We are prepared to meet with you in Puerto Rico at your convenience if it will help to expedite this project.

Yours very truly,

[illegible]

Stanley Learned

SSL:mg
Attachments

E 326

TABLE I

[redacted] - [redacted]

(In Millions of Dollars)

Item	1	2	3	4	5	6	7	8	9	Total
Total Investment (Note 1)	45.0	-	-	20.0	-	15.0	-	20.0	-	100.0
Total Investment Outstanding During Year	-	-	45.0	65.0	65.0	80.0	80.0	100.0	100.0	-
Gross Profits During Year	-	-	20.0	13.5	13.5	16.0	20.5	22.0	24.0	118.5
Profits Reinvested by Years (Note 2)	-	-	8.0	10.0	9.5	12.5	16.0	18.0	20.0	94.0
Profits Reinvested Cumulative	-	-	8.0	18.0	27.5	40.0	56.0	74.0	94.0	
Total Investment at Year End	-	45.0	45.0	65.0	65.0	80.0	80.0	100.0		

Notes: 1. Original investment a combination of
(a) Equity capital by Phillips Petroleum Company
(b) Equity Capital by Puerto Rican Investors
(c) Loans by Phillips to Chemical Corporation
(d) Subsidiary loans to Chemical Corporation

2. Profits reinvested include
(a) Capital investment in new projects
(b) Payoff of prior loans

3. Profits are assumed to be reinvested in such a manner as to ensure maximum advantages of Puerto Rican laws governing tax exemptions or business advantages in Puerto Rico. This schedule as presented shows that total investment can probably be built up to around $100 million in about 7 years after operations start.

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TABLE II

ECONOMICS OF PETROLA OPERATIONS IN FINAL FORM

(At Full Capacity)

Naphtha Charge, Barrels Per Day	30,000
Capital Investment	$ 45,000,000
Working Capital	17,000,000
Total Capital Employed	$ 62,000,000
Annual Income	
Cyclohexane	$ 6,270,000
Benzene	5,790,000
Ethyl Benzene	2,348,000
o-Xylene	2,373,000
p-Xylene	3,499,000
Light Naphtha	3,941,000
Motor Fuel	31,391,000
Income from Major Products	$ 55,632,000
By-Product Credit (Fuel Gas)	8,000,000
	$ 63,632,000
Annual Operating Costs	
Feed Stock @ $1.91/Bbl	$ 34,650,000
Direct Operating Costs	8,061,000
Interest on Working Capital @ 6%	1,020,000
Sales Expense (1% of Product Value)	556,000
U.S. Tariff (10.5¢/Bbl on 60% of Charge)	1,150,000
Total Expense	$45,447,000
Annual Profit Buying Tax-Exempt Fuels	$ 17,365,000
% of Capital Investment	39%
% of Total Capital Employed (Excluding Interest on Working Capital as Expense)	30%

12-16-43

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Table XII

[illegible]

Cyclohexane	20,000,000 gal/yr
Benzene	30,000,000 gal/yr
Vinyl Benzene	63,000,000 lbs/yr
Ortho-Xylene	62,000,000 lbs/yr
Para-Xylene	49,000,000 lbs/yr
*Light Naphtha	2,000 bbls/day
Motor Fuel	24,000 bbls/day

*Assumed sold to European chemical operations.

12-16-63

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TABLE IV

[redacted]

[redacted]

[redacted]

[redacted]

AB Chemical Company
[redacted] Company
[redacted] Company
[redacted] Chemical Company
[redacted] Chemical Company
Dow Chemical Company
E. I. DuPont de Nemours Company
[redacted] Company
Frontier Chemical Company
Goodrich-Gulf Chemical Company
Hercules Powder Company
Hooe Oil & Chemical Company
[redacted] Chemical Company
Hoss and Hoss Company
Shell Chemical Company
Texas Butadiene & Chemical Company
Texas Eastman Company

[redacted]

[redacted] - A Sedin - Fabrik (W. Germany)
[redacted] (Japan)
[redacted] (France)
[redacted] (Japan)
[redacted] (Italy)

12-16-43

EF-223

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J-44, Letter, Learned to Durand, January 2, 1963

USA 33a - 475
(ED. 4-23-71)

E 330
EXHIBIT
U. S. DIST. COURT
S. D. OF N. Y.

J-44

FPI-MI—9-24-75-SON-4417

January 2, 1964

Mr. Rafael Durand, Administrator
Economic Development Administration
Commonwealth of Puerto Rico
San Juan, Puerto Rico

Dear Mr. Durand:

Attached are two copies of a brochure presenting in more detail the project for petrochemical manufacture in Puerto Rico outlined in my letter of December 16, 1963.

Very truly yours,

Stanley Learned

SL:lm
Attach. (2)
cc: Mr. Oscar Chapman, w/encl. (5)

bcc: Messrs. J. P. Coan, w/encl. (1)
W. C. Hewitt " (1)
P. J. Parker " (1)
R. M. Waldby " (1)
Carstens Slack " (1)
S. Learned-File" (1)
J. G. Allen " (1)

J-45, Brochure, January 1964

J-95

E 331

ESTABLISHMENT OF A CORE CHEMICAL INDUSTRY IN PUERTO RICO

PHILLIPS PETROLEUM COMPANY

BARTLESVILLE, OKLAHOMA

January 1964

E 332

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Report in Brief

[redacted]

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REPORT IN BRIEF

The purpose of this report is to outline the project for a petrochemical core industry as an essential part of the economic development of Puerto Rico, and to request an oil import allocation to establish this new industry.

SPONSORSHIP OF PROJECT

This proposal is sponsored by Phillips Petroleum Company in all phases from furnishing raw material from its integrated operations to assisting in marketing the chemical products through its world-wide sales organization (See Section I).

VALUE TO PUERTO RICO

The economy of Puerto Rico will benefit by the establishment of a company whose express purpose is the development of a petrochemical industry. With the lack of indigenous raw materials, the greatest efficiency is obtained by importing selected hydrocarbon fractions that give the highest yields of the desired chemical products. By proper selection of chemicals to be produced in the first step of the project, the availability of these intermediates should promote satellite plants for finished chemicals and consumer goods by expansion of the original company and by other chemical companies now operating in the Continental United States and in other parts of the world.

Thus, this beginning of a petrochemical complex should provide a major construction program and an immediate chemical feed plant as a basis to attract more chemical plants. All this should assure continuing growth for several years as this chemical complex and its supporting auxiliaries increase.

The benefits of new, expanding industry are especially valuable since it is planned to locate this complex in a critically depressed economic area on the western side of the Island.

Thus the establishment of the core plant for petrochemicals is essential to the orderly development of the petrochemical industry of Puerto Rico. (See Section II).

PROPOSED OPERATIONS

It is proposed to start the core plant with a charge of 50,000 B/D of select naphtha fractions provided from other Phillips' operations. The first round of chemicals manufactured would be as follows:

Cyclohexane	33 million U.S. gal/yr.
Benzene	30 " " " "
Ethyl Benzene	62 " lb/yr.
Ortho-Xylene	68 " " "
Para-Xylene	49 " " "
Light naphtha (suitable for hydrogen or ethylene manufacture)	8,000 B/D

All of these products are established chemical intermediates and as such have world markets presently. They also have definite possibilities for further processing in Puerto Rico to additional stages of derivatives, which will also have world markets. (See Section III).

FINANCIAL FEASIBILITY OF PROJECT

It is proposed that this project be built up by stages. In order to implement this program, as soon as an import quota is granted by the Oil Import Administrator, Phillips plans to promote the base plant, requiring a capital investment of some $45,000,000 in Puerto Rico. An additional $17,000,000 of working capital is also required. Under the expected successful initial operations, expansion of the petrochemical complex is expected from (1) new ventures attracted by available raw materials and (2) reinvestment of profits from the initial plants.

We feel that the plant investment will be increased to over $100,000,000 within 5 to 6 years after initial operation of the plant and there is a potential of at least $300,000,000 to $500,000,000 of economical investment in this complex, considering consumer goods and supporting services. (See also Section IV for further details).

ENGINEERING FEASIBILITY

Plant Location: Site studies conducted for the Economic Development Administration of the Commonwealth have shown a very satisfactory site near the town of Añasco, just north of Mayagüez on the west coast of the Island. From standpoints of building room, harbor development, manpower and housing this location seems to be suitable. The facilities of the University of Mayagüez should fit into a research center and a training center for the first employees of the plant. Full cooperation of the EDA has been promised in site development.

Process Design: The use of naphtha fractions rather than whole crude as raw material greatly improves the economics of this operation. The process scheme is lined out to first make basic chemical intermediates, starting with aromatics, and later expanding into other chemical facilities; then into higher value chemical derivatives and finally into consumer goods such as fabrics and fertilizers. All of the manufacturing steps outlined are by established processes, with investment requirements and manufacturing expenses defined by experience.

Commonwealth Developments: This proposal has the full backing and cooperation of the Puerto Rican authorities. The project appears to be a key investment to set off a chain of events of expansion of commerce and industry that are essential to further development of the Island's economy. (See also Section V).

MARKETING OF CHEMICALS

Since at the beginning of a chemical project such as this there is practically no local market for the chemicals produced, it has been necessary to consider marketing on a global scale. Products scheduled for initial production we believe can be absorbed principally in Continental U.S. and European markets. Future developments may make it desirable to also manufacture some of these products within the bounds of the Common Market.

Phillips' market survey specialists have set realistic quantities for world-wide sales and expected netbacks on the products considering expected sales prices, freight, tariffs, etc. Although the quantity of some of these chemicals is substantial in expected world markets, we feel that Phillips' marketing experience will prove very valuable in moving products from the manufacturing plant to markets. (See also Section VI).

CORPORATE ORGANIZATION AND MANAGEMENT

It is expected that the business in Puerto Rico will be conducted in corporate form in which the Puerto Rican public will be offered participation. The corporation will be set up so as to qualify for all investment incentives under Puerto Rican law. Profits from the first several years' operations could be reinvested in expansion projects and/or used to retire indebtedness.

We would expect that Puerto Rican investors would be represented on the Board of Directors of the new corporation. In addition, the initial phase of this project should provide construction and operational jobs for several hundred Puerto Ricans for several years. It is the intention of Phillips to provide training in trade, maintenance and operational jobs so that a maximum number of Puerto Ricans can be employed in construction and operation of the complex. (See Section VII).

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REQUEST FOR IMPORT ALLOCATION

To implement this economic proposal, it is necessary for Phillips Petroleum Company to have a special import quota to allow 50,000 B/D of naphtha to enter Puerto Rico as chemical raw material. It is expected that the Economic Development Administration of Puerto Rico will propose this quota for Phillips to the Oil Import Administrator of the U.S. Department of Interior. The staff of Phillips is ready to assist in any way possible.

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SECTION II	Value to Puerto Rico
SECTION III	Summary of Proposed Operations
SECTION IV	Financial Feasibility of Project
SECTION V	Engineering Feasibility of Project
SECTION VI	Marketing of Chemicals
SECTION VII	Proposed Corporate Organization

CSE

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Section I

SECTION I - SPONSORSHIP OF PROJECT

This concept of a growing petrochemical complex is being sponsored by Phillips Petroleum Company, with multiple interests of supplying raw materials, supervising construction and operations, financing, and assisting in selling products, all put together as an enterprise profitable to the Commonwealth of Puerto Rico and to participants in the venture.

This concept is defined in the letter which follows from Mr. Stanley Learned, President of Phillips Petroleum Company, to Mr. Rafael Durand, Head of the Economic Development Administration of Puerto Rico.

E 342

Phillips Petroleum Company
Bartlesville, Oklahoma

Copy

December 16, 1963

Mr. Rafael Durand, Administrator
Economic Development Administration
Commonwealth of Puerto Rico
San Juan, Puerto Rico

Chemical Manufacturing Facilities
in Puerto Rico

Dear Mr. Durand:

We have been analyzing Puerto Rico's potential in the manufacture of chemical products for world marketing with several members of your organization and our own International Department and Executive Department officials. We now propose a project which can provide benefits to Puerto Rico, the Continental United States, and Phillips Petroleum Company.

The basis of the proposed operation is through a unique combination of resources to provide maximum petrochemical yields in Puerto Rico and yields of by-product motor fuels not to exceed 50 per cent of the feed stock used. In addition it is planned to encourage maximum participation in the project by Puerto Rico capital.

The most important consideration developed from our studies is that a core chemical manufacturing plant charging 50,000 barrels per day of carefully selected hydrocarbon fractions offers a potential for an eventual sound investment of $300,000,000 to $500,000,000 in a series of plants necessary to convert the raw materials to consumer goods. Such an investment will give employment to many thousands of people in direct and affiliated operations. In addition, large numbers of people will have to be employed in development of community housing and support services.

The potential for development of new products, services and employment with the establishment of this basic industry is limited only by our joint efforts to develop markets. Our confidence in the future of this industry in Puerto Rico is such that

we are willing and able to make an initial investment of $45,000,000 in basic petrochemical facilities. In addition we will place all of the technical and marketing capabilities of Phillips Petroleum Company in support of efforts to develop additional investment by ourselves and our customers. After this initial stage the project itself should offer so many benefits to Puerto Rico and its customers that it will generate on its own the funds required for continuing development.

Our decision to make this major initial commitment in Puerto Rico is based largely on our confidence in the continued support of Puerto Rico's manpower, financial and material resources. Certainly the major incentives offered through the Economic Development Administration for encouragement of new industries have had a major bearing on our decision to make such investment.

We recognize that substantial quantities of chemical materials will be produced which cannot currently by consumed within Puerto Rico. Accordingly, we are prepared to apply the efforts of our worldwide marketing organization toward the successful sale of these chemical products.

Summarizing the results of our work, Phillips can provide the following unique combination of advantages for this project:

1 - Supply of select hydrocarbon fractions, all of which are suitable for chemical manufacture, rather than a supply of crude oil as feedstock.

2 - Use of Phillips' proven technical knowledge and experience in petrochemical manufacture.

3 - Use of Phillips' worldwide petrochemical marketing organization to help to establish markets for all products in excess of the internal requirements of Puerto Rico.

Immediately after a quota for Phillips Petroleum Company to import 50,000 barrels per day of select hydrocarbon fractions to Puerto Rico can be obtained, we are ready to implement this project.

As indicated, our initial investment in petrochemical facilities will be $45,000,000. Our present market forecasts indicate that within 5 or 6 years after the operation is on stream there will be a demand for products to support an expansion of the facilities to a gross investment in excess of $100,000,000.

We are attaching an economic analysis and a schedule of operating results for the proposed complex. In addition, a summary of products to be produced and a partial listing of possible satellite companies which will be interested in a new source of materials in the Caribbean is provided. Supporting these addenda are extensive confidential Phillips' surveys and reports concerning economic, operating, financial, engineering, organization and research considerations. These are available to you as required.

This project will provide substantial benefits and a means for Puerto Rico to participate prominently in world chemical markets. We are prepared to meet with you in Puerto Rico at your convenience if it will help to expedite this project.

Yours very truly,

Original Signed by

Stanley Learned

SSL:mg
Attachments

TABLE I

SCHEDULE OF FINANCIAL OPERATIONS - PUERTO RICO

(In Millions of Dollars)

Year	1	2	3	4	5	6	7	8	9	Total
Total Investment (Note 1)	45.0	-	-	20.0	-	15.0	-	20.0	-	100.0
Total Investment Operating During Year	-	-	45.0	45.0	45.0	65.0	65.0	80.0	80.0	-
Gross Profits During Year	-	-	10.0	13.5	13.5	16.0	19.5	22.0	24.0	118.5
Profits Reinvested by Years (Note 2)	-	-	8.0	10.0	9.5	12.5	16.0	18.0	20.0	94.0
Profits Reinvested Cumulative	-	-	8.0	18.0	27.5	40.0	56.0	74.0	94.0	
Total Investment at Year End	-	45.0	45.0	45.0	65.0	65.0	80.0	80.0	100.0	

Notes:

1. Original investment a combination of
   (a) Equity capital by Phillips Petroleum Company
   (b) Equity capital by Puerto Rican Investors
   (c) Loans by Phillips to Chemical Corporation
   (d) Outside loans to Chemical Corporation

2. Profits reinvested include
   (a) Capital investment in new projects
   (b) Payoff of prior loans

3. Profits are assumed to be reinvested in such a manner as to secure maximum advantage of Puerto Rican laws governing tax exemptions as business advantages in Puerto Rico. This schedule as presented shows that total investment can probably be built up to around $100 million in about 7 years after operations start.

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TABLE II

ECONOMICS OF INITIAL OPERATIONS IN PUERTO RICO

(AT FULL CAPACITY)

Naphtha Charge, Barrels Per Day	50,000
Capital Investment	$ 45,000,000
Working Capital	17,000,000
Total Capital Employed	$ 62,000,000
Annual Income	
Cyclohexane	$ 6,270,000
Benzene	5,790,000
Ethyl Benzene	2,348,000
o-Xylene	2,373,000
p-Xylene	3,499,000
Light Naphtha	3,961,000
Motor Fuel	31,591,000
Income from Major Products	$ 55,832,000
By-Product Credit (Fuel Gas)	8,000,000
	$ 63,832,000
Annual Operating Costs	
Feed Stock @ $1.91/Bbl	$ 34,858,000
Direct Operating Costs	8,861,000
Interest on Working Capital @ 6%	1,020,000
Sales Expense (1% of Product Value)	558,000
U.S. Tariff (10.5¢/Bbl on 60% of Charge)	1,150,000
Total Expense	$ 46,447,000
Annual Profit During Tax-Exempt Period	$ 17,385,000
% of Capital Investment	39%
% of Total Capital Employed	30%
(Excluding Interest on Working Capital as Expense)	

12-30-63

TABLE III

INITIAL PRODUCTS DERIVED FROM 50,000 B/D FEEDSTOCK - PUERTO RICO

Cyclohexane	33,000,000 gal/yr
Benzene	30,000,000 gal/yr
Ethyl Benzene	62,000,000 lbs/yr
Ortho-Xylene	68,000,000 lbs/yr
Para-Xylene	49,000,000 lbs/yr
*Light Naphtha	8,000 bbls/day
Motor Fuel	24,800 bbls/day

*Assumed sold to European chemical operations

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TABLE IV

SELECT LIST OF

CUSTOMERS OF PHILLIPS PETROLEUM COMPANY

FOR INTERMEDIATE CHEMICALS

DOMESTIC

AB Chemical Company
Alamo Chemical Company
American Cyanamid Company
Celanese Chemical Company
Dow-Badische Chemical Company
Dow Chemical Company
E. I. DuPont de Nemours Company
Eastman Kodak Company
Frontier Chemical Company
Goodrich-Gulf Chemical Company
Hercules Powder Company
Hess Oil & Chemical Company
Monsanto Chemical Company
Rohm and Haas Company
Shell Chemical Company
Texas Butadiene & Chemical Company
Texas Eastman Company

INTERNATIONAL

Badische Anilin - & Soda - Fabrik (W. Germany)
Mitsui (Japan)
Progil (France)
Rhone-Poulenc (France)
Sicedison (Italy)

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We feel that the establishment of the core chemical industry will be the beginning of a new era in the industrial expansion of Puerto Rico. This first step is the means of economic improvement by upgrading a low-quality naphtha to a family of high-value aromatic products and their derivatives.

The procedure is especially beneficial to the Island's economy in that the plant is being located in an economically depressed area where benefits are greatest in raising the living standards of Puerto Rico. Local employment will start with the beginning of field construction. During about 15 months of field construction, manpower should average 800-900, of whom 90 per cent should be native Puerto Ricans. Operations should require 300-400 Puerto Ricans as steady employees. If construction continues at a more or less steady pace for several years, there should be a fairly steady demand for 600-700 construction workers after the initial plant is operating.

As with all economics, once a new project is started, there is still further impetus from supporting service industries. Plans have also been discussed to sponsor a research center around the University of Mayagüez. And for further necessary development of craftsmen and operators, a new training school is projected.

All of this new boost to Puerto Rico's economy depends on getting started on a new form of upgrading of imported raw material. The development scheme for this proposed chemical complex meets this need. It is an opportunity for an economically attractive industry that should not be rejected.

SECTION III - SUMMARY OF PROPOSED OPERATIONS

Initial operations contemplate the following products to be derived from 50,000 B/D of select naphtha fractions:

Cyclohexane	33 Million Gallons per year
Benzene	30 Million Gallons per year
Ethyl Benzene	62 Million Pounds per year
Ortho-Xylene	68 Million Pounds per year
Para-Xylene	49 Million Pounds per year
Light Naphtha (to chemicals elsewhere)	8,000 Barrels per day
By-Product Motor Fuel	24,800 Barrels per day

This process scheme to make these products is given on the flow sheet following.

Plant construction will probably require two years' time after construction is approved. Full capacity should be achieved by the second year of operations. It is contemplated that future stepwise operations will use some of these products as charge stock for further up-grading. Prominent in such discussions have been:

Dacron fiber from p-xylene
Urea from light naphtha via hydrogen and ammonia
Styrene from Ethyl Benzene
Phthalic anhydride from o-xylene
Ethylene and derivatives from naphtha

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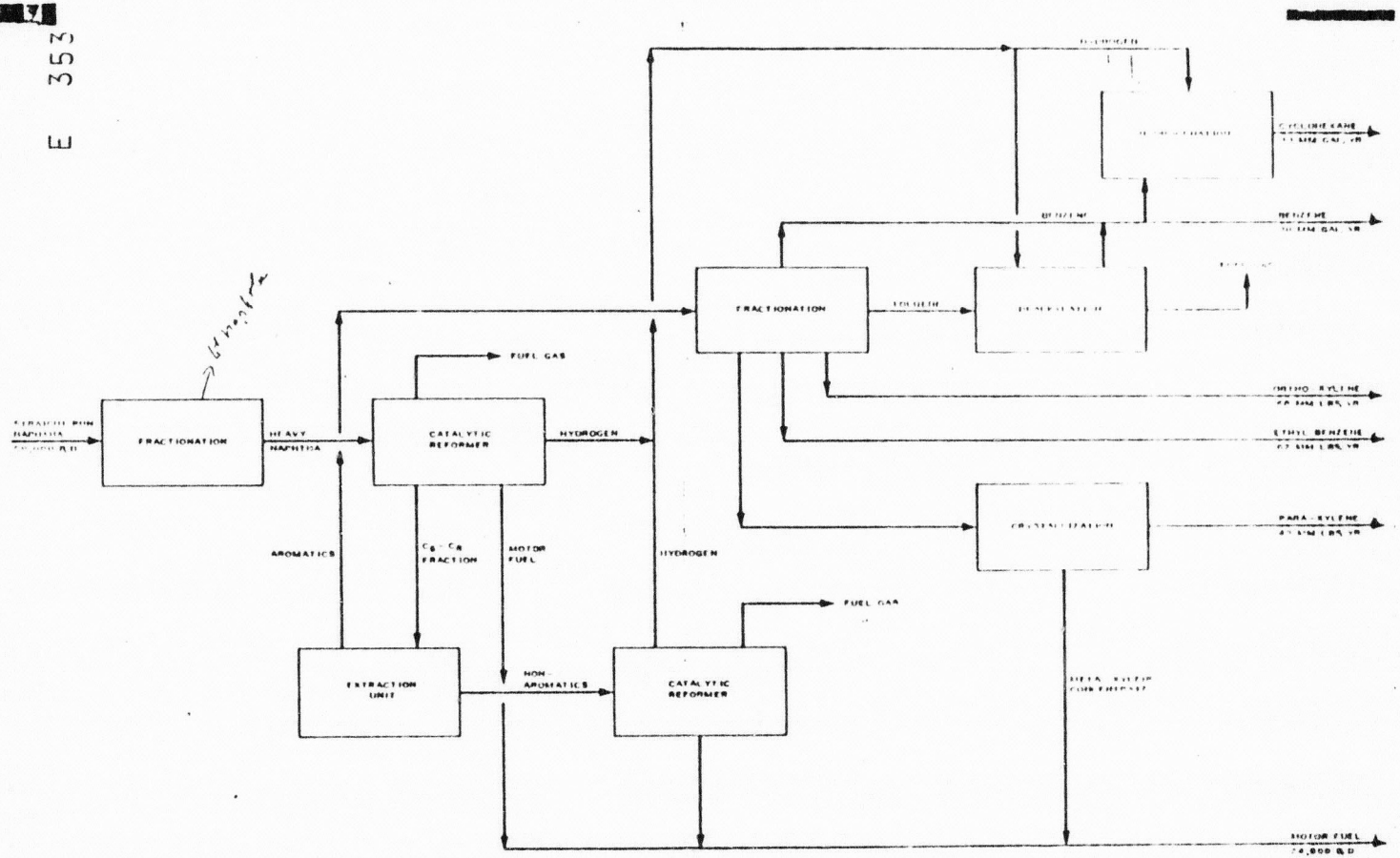
FRACTIONATION
HEAVY NAPHTHA
CATALYTIC REFORMER
HYDROGEN
FUEL GAS
FRACTIONATION
TOLUENE
BENZENE
ORTHO XYLENE
ETHYL BENZENE
PARA XYLENE
AROMATICS
C6 - C8 FRACTION
MOTOR FUEL
HYDROGEN
FUEL GAS
EXTRACTION UNIT
NON AROMATICS
CATALYTIC REFORMER
MOTOR FUEL

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SECTION IV - FINANCIAL FEASIBILITY OF PROJECT

The project as outlined appears to have a strong financial incentive. Raw material (naphtha) is available currently as excess material in Europe and in crude oils supplying Europe. The initial products proposed fit well into world markets and do not appear to be too large a part of total demands to be a serious problem. Thus a profitable operation appears assured, even allowing some deterioration in both marketable quantities and prices. (See Section I also). The assistance of Phillips Petroleum Company's resources in arranging for raw materials and in marketing adds stability to the whole scheme.

The initial investment in process equipment and supporting auxiliaries is expected to be $45,000,000 plus working capital of some $17,000,000. This total capital will probably be arranged about as follows: (1) Equity capital, partly offered to Puerto Rican investors ($20,000,000); and (2) Loans and credits ($42,000,000).

This plant should work up to a profitable operation in a short time. Consideration should be given to reinvestment of profits in the second phase of the complex. The exact timing of reinvestment, size of equity recommended in the expansion, etc. are not defined as yet and need certain checking under provisions of Puerto Rican tax exemption laws. The basic plan would be to expand as internal funds are available, reviewing the marketing picture periodically to establish the order of new investments.

It appears probable that the original investment can be built up to over $100 million in about 7 years after operations first start, all financed by internal earnings.

At this point, the corporate tax situation would need review to see how operations should be set up to insure return of maximum profits to stockholders.

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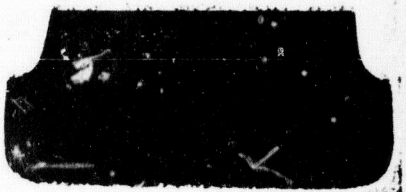

By engineering feasibility it is meant the confidence of attainment of the goal of successful operation of an economically attractive plant. There are several features contributing to this feasibility.

1. Plant Site: With importing of raw materials and exporting of products, good shipping facilities are needed. Adequate room for the plant and auxiliaries, with plenty of space for expansion, is needed. Drainage, water supply and other utilities are important. People and auxiliary services are to be considered. All of these and other qualifications have been studied, principally from material furnished by EDA of Puerto Rico. The most likely site is on Añasco Bay, just north of Mayagüez on the west coast.

Physical features entering into this selection are discussed in the attached report by Dr. Ta Liang, consultant to EDA.

2. Process Design: In order to start this project, products for manufacture were chosen which are presently merchant chemicals. Prospective markets and prices were recommended by Phillips market survey specialists. Processes recommended for manufacture of these chemicals are well known, and in most cases are processes with which Phillips has had operating experience. Thus, the economic analyses are believed to be of a high degree of accuracy and are used with confidence.

The operating scheme beyond the first step has considerable flexibility in future steps to be taken. These can follow in the order dictated by economics of the day.

3. Supporting Facilities: Full cooperation of the island authorities has been promised in matters of harbor development, definition of a free trade area if desirable, supply of electric power, etc.

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PUERTO RICO PORTS AUTHORITY

SAN JUAN, PUERTO RICO

FINAL REPORT

AN INVESTIGATION
OF
ON-SHORE AND OFF-SHORE PHYSICAL FEATURES
OF
POTENTIAL PORT SITES

PUERTO RICO

TA LIANG, CONSULTANT
ITHACA, NEW YORK

DECEMBER, 1960

ACKNOWLEDGEMENT

The writer takes pleasure in acknowledging his appreciation of the general guidance provided by Mr. Rafael L. Ignacio and Dr. Salvador M. Padilla, respectively Chief Planner and Accelerator of the Puerto Rico Ports Authority, throughout this investigation. Mr. Arturo Lamadrid of the Ports Authority coordinated the work and rendered numerous services during the early studies, both in the office and in the field; his unfailing efforts are especially appreciated. Mr. Jesús R. Bascarón coordinated the work and provided competent assistance during the final stage of this investigation.

Many engineers and officials generously extended their assistance and cooperation during the investigation of various sites throughout the island. They included: Mr. Artemis Segarra and Mr. Froilán Garcia of the Planning Division, Puerto Rico Ports Authority; Mr. E. Gracia, Consultant, and Mr. A. Dauway, Chief Engineer of the Puerto Rico Ports Authority; Mr. Rafael Seijo, and Mr. William Gahagan, respectively Chief Engineer and Resident Engineer, Gahagan Overseas Dredging Company, San Juan; Captain Angel Maldonado, Port of Fajardo; Mr. José H. Martinez, U.S. Department of Agriculture Officer, Fajardo; Representative Enrique J. Andrade of Aguirre; Mr. Ernesto Ruiz, Ponce Port Supervisor; Mr. M. A. Sastre of Mercedita Central; Mr. Pedro L. Vivas, Geologist, Ponce; Captain Oscar Padilla, Port of Guayanilla; Captain William Suarez, Port of Guánica; Mr. Thomas W. Crump, President, Star-Kist Caribe, Inc.; and Mr. Ismael R. Muñoz, Resident Engineer, Mayagüez.

Mr. Ernesto A. Pinero and Mr. Zenon Mercado, of the Puerto Rico Department of Public Works, graciously cooperated in the procurement of aerial photographs and topographic maps covering the sites.

Several specialists had contributed their expert advice in New York during this investigation. They included: Dr. N. A. Christensen on sedimentation; Dr. C. H. Yen on port location; and Professor B. K. Hough on subsurface exploration.

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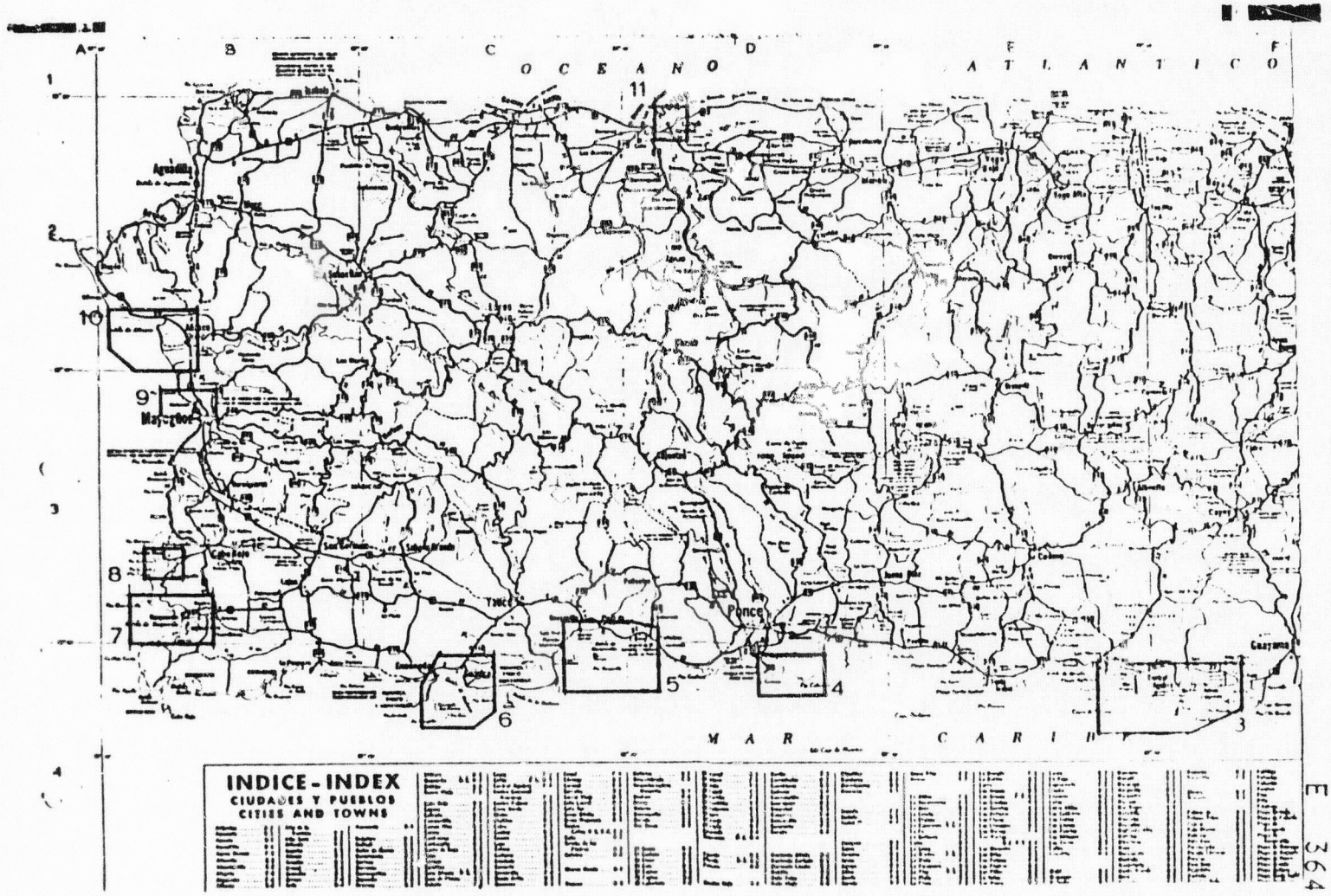
PART I

GENERAL

Publications and reports consulted during this investigation are listed under the section of "Selected Bibliography" in this report.



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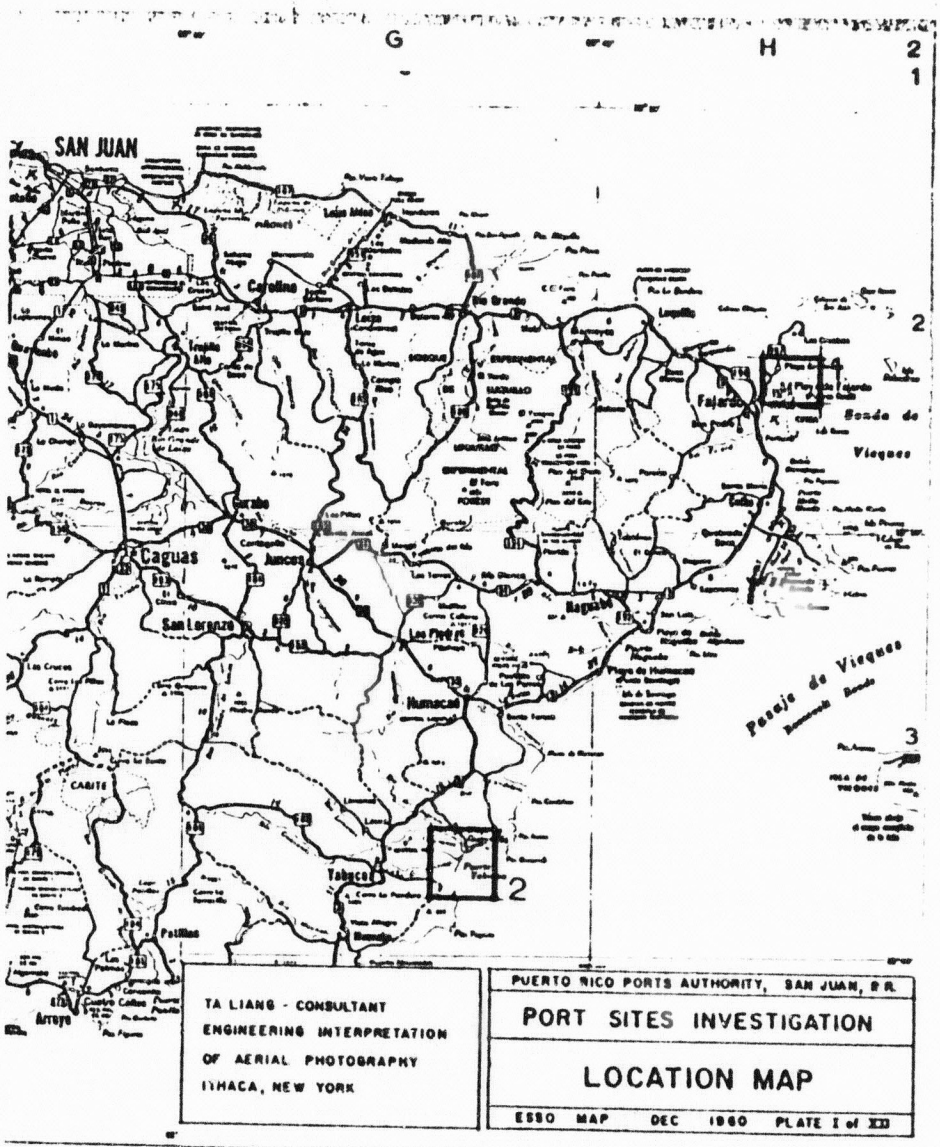

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ENGINEERING INTERPRETATION
OF AERIAL PHOTOGRAPHY
ITHACA, NEW YORK

PUERTO RICO PORTS AUTHORITY, SAN JUAN, P.R.

PORT SITES INVESTIGATION

LOCATION MAP

ESSO MAP DEC 1960 PLATE I of XII

CENTRALES AZUCARERAS
SUGAR MILLS

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2. Summary of Work:

Immediately upon signing of the contract in November 1959, office study was started in New York. Reference materials were obtained from both Washington and San Juan. Aerial photographs were secured from the Puerto Rico Department of Public Works (1:15,000 scale; 1951 series), as well as from the Mark Hurd Aerial Survey Corporation of San Juan (1:4800, 1959 series).

Field investigation was undertaken during the weeks of January 25 and February 1, 1960. During the first week, the consultant was accompanied by Mr. Arturo Lamadrid of the Ports Authority; during the second week, Mr. Froilán Garcia of the Ports Authority also joined the field party. During this field investigation, all the proposed sites were visited, except Fajardo which was subsequently visited during a brief trip in August 1960.

In addition to these ground investigations, the consultant was fortunate to have an opportunity, in the summer of 1959, to fly over the coastal areas in a light plane to observe the physical conditions of most of the port sites described in this report. This air trip was made with Dr. Salvador Padilla, then Chief Planner of the Ports Authority; the trip proved to be most helpful in this investigation.

During the visits to each site, besides first-hand observations of physical conditions, local people were inquired of their experience including wind speed and direction, wave heights and floods. Harbor officials, engineers and geologist, were interviewed whenever possible. After the return of the field party to San Juan, technical people from various organizations were further consulted and valuable information obtained and incorporated into this report.

With the wealth of information gathered from photos, maps and other scurces it is believed that the general soil and geological conditions, particularly in on-shore areas, are sufficiently clear for the purpose of a preliminary study of port locations. Thus, a preliminary report including a series of maps showing physical conditions of

all sites was prepared and submitted in April 1960 for discussion. Accordingly, a conference between the officials of the Ports Authority and the consultant was held in San Juan during August 1960 to discuss the details for production of this final report.

The desirability of a boring program had been discussed during this investigation. It was felt that a limited boring program at this stage may add some information to the off-shore conditions, but probably would not change the over-all perspective. Therefore, the submission of this final report will not await the field borings. Rather, all the preferred sites and suggested boring areas are indicated in this report. When a detailed study is to be undertaken in particular sites in the future, a systematic boring program guided by the general information herein given should be executed prior to design and construction.

3. Method of Investigation:

A. On-Shore Areas. An extensive study of the topographic maps, geological and soil maps of each port area is the first step. This is then followed by a careful analysis of the small and large scale aerial photographs. The small scale photos provide over-all perspectives whereas the large scale photos show detailed features, complementing each other.

All aerial photographs are studied with a stereoscope to give a three-dimensional view. The topographic, drainage and erosion patterns, vegetation, and gray tones on the photos are examined to determine the rock and soil types. Tentative rock and soil boundaries are drawn on photographs and then transferred to maps. These boundaries are subsequently checked against field observations and subsurface information obtained from various sources. Finally, the map is revised to its final form after a restudy of all pertinent reference material.

The map units that delineate the various rock and soil types are tailored to the anticipated requirements of port site developments. They generally indicate the depth of overburden, the type of soil or rock regarding drainage and excavating characteristics, slope stability, and bearing capacity for buildings and structures. Water table and flooding possibility are also considered.

In mapping the soils, direct recognition of features on photos and from field observations as well as inference guided by established scientific principles are fully utilized. Soil forming processes, transportation and deposition of soil through actions of streams and waves, and influence of ecologic enviornment are all taken into consideration.

B. Off-Shore Areas. The off-shore conditions presented in this report are derived from a careful study of hydrographic charts, airphoto patterns, local information from engineering personnel and estimates based on principles of sedimentation. It must be stated clearly that while on-shore soil conditions are generally well-defined on airphotos, off-shore features are much less so, and therefore should be considered relatively not as accurate.

The study of each site begins with a careful comparison of hydrographic charts and corresponding airphotos. Tentative conclusions of the off-shore conditions are drawn and maps compiled delineating areas of rock, sandy soils and fine-textured soils. The areas having water depths greater than thirty feet are considered adequate for navigation; they are so indicated and excluded from further study in this investigation. The mapping boundaries are then checked against other available information as well as conclusions deduced from a study of the sedimentation process. Some of the highly uncertain areas are designated by question marks after the map units or shown with dotted boundaries, indicating a need of field confirmation should these areas be considered seriously for future construction.

In spite of the uncertainty of the accuracy of off-shore features in some areas, it is believed that the maps are essentially dependable and indicative of the prevailing general conditions which are required at this stage. Because of the vastness of the areas covered, it would not be economically justifiable to go into a detailed boring program. Scattered borings may not add much to what is known and they would not alter the present conclusions significantly.

4. Physical Factors Affecting On-Shore Soils:

A. Geology. This investigation relies heavily on a careful analysis of the geological process operating in the past as well as present. The Island of Puerto Rico has a central east-west core of mountain ranges composed of a complex of volcanic and sedimentary rocks, some metamorphosed. Intrusive rock hills are found in scattered areas; the granites in Yabucoa and in Utuado areas are the major ones. There are two belts of recent limestone hills: one along the north coast, and the other the southwest coast. Talus slopes and alluvial cones and fans are located between the hills and the flat lands. The latter consists of coastal plains, flood plains, beach sands, beach ridges, tidal flats and swamps, extending to the coast. Coral reefs and islands are common along the coasts.

The parent rock and the mode of transportation greatly influence the soil characteristics. Generally, granites and the more resistant volcanic rocks are the sources of sands and gravels whereas the less resistant volcanic rocks and limestones yield silts and clays. Natural transporting agents, water, wind and gravity, sort the materials while moving them. Water and wind leave the larger-sized materials near to the source but carry the smaller-sized to a farther destination. This principle is applicable to river deposits as well as coastal deposits where wave drops sand on the beaches and carries the fine-textured sediments toward the sea. Gravity force operates in a somewhat different manner; in talus slopes, large-sized materials fall the greatest distance to the bottom whereas small-sized materials remain close to their original position.

B. Climate. Temperature and rainfall affect soil formation and transportation. Although temperature is fairly uniform throughout the Island, the variation of rainfall is considerable from one part to the other. This has profound effects on such developments as depth of rock weathering, degree of laterization, and soil erosion. They are taken into consideration in soil classification and mapping.

C. Vegetation. Both natural vegetation and cultivation practices are closely related to the soil properties. Vegetation affects soil biologically and then itself is an accurate indicator of soil conditions such as soil texture, water table and salt and alkali contents. For instance: sugarcanes prosper in well-drained silty flat land; coconuts are best grown in sandy coastal areas where water table is more than three feet below surface; and mangrove is identified with low swampy areas. Vegetative patterns like these are well shown on airphotos. Furthermore, transitional zones between different soil areas where crops gradually fall under changing natural soil enviornments are often clearly discernible on photographs.

5. Physical Factors Affecting Off-Shore Soils:

A. Source of Material. The off-shore material is either originated from inland behind the coastal area and then transported and discharged into the harbor, or originated from the outside and then carried and deposited into the harbor by ocean currents. In the first case, the material is closely related to the local on-shore soil which in turn is a product of its parent material and transportation forces. In the latter case, the material is either a weathering product of nearby coral reefs and rock headlands or sediments from other parts of the Island.

B. Currents, Winds and Waves. It is well established that the ocean currents move from east to west, and from south to north around the Island. Also, there are some seasonal eddy currents along the north coast. These currents are responsible for the transportation of the sea-bottom materials in the broadest scale.

The prevailing winds of the Island are from north and northeast. As a result, the waves are strongest on the north and northeast coasts. In contrast, the south and west coasts are relatively quiet through most of the year. The wind and wave conditions greatly influence the particle size and slope of off-shore material, growth of coral reef and beach rock, the depth of channels and the development of tidal flats and swamps. These conditions are indicated in the maps of specific port sites in this report.

6. Map Units:

A system of map units has been devised to reveal the soil and geologic conditions of both on-shore and off-shore areas. The map units are designed to provide information in a convenient way to facilitate port site planning. A description of these units follows:

A. On-Shore Map Units

I. Bedrock and Residual Soils

The area is composed of either bare rock or residual soil with parent rock at varying depths. Topography is rolling to hilly. Deep excavations might encounter rock. Drainage and foundation condition is generally favorable. Certain special conditions are described under pertinent sites.

Ia. Granite

Generally sandy and silty soil with rock fragments. Well-drained but may be erodable.

Ib. Limestone

Generally clays and stoney clays with limestone at varying depths. Well-drained in natural undisturbed state.

Ic. Tuff, Tuff Breccia, Andesite and Shale

Generally friable clays and silts with rock fragments.

Id. Cemented Dunes and Sandstones

Generally shallow sandy soil and sandstone.

II. Talus, Alluvial Cones and Alluvial Fans

The area is composed of soil transported to its position by gravity or water. There is a gently to steeply sloping topography. Generally coarse-textured soils. Parent material is at varying depth. Drainage condition is favorable.

Foundation condition is good except in steep talus slopes. Certain special conditions are described under pertinent sites.

IIo. Talus (Limestone Material)

Steep slope of clay soil and limestone fragments. Larger fragments are accumulated at lower slopes.

IIa. Alluvial Cone and Fan (Granite Material)

Gentle slope of sandy to silty soil. Generally well-drained, good foundation. Material is coarser near to the head of the fan and finer toward the lower edge.

IIb. Alluvial Cone and Fan (Limestone Material)

Gentle slopes of clays and silts with some limestone fragments. Poor to moderately well-drained.

IIc. Alluvial Cone and Fan (Tuff or Shale Material)

Gentle slopes of silts, clays and rock fragments. Poor to moderately well-drained.

III. Flood Plains

The area is composed of uniform alluvial deposits. The topography is flat. Excavation is easy. Foundation and ground water condition variable depending on the following sub-units. Special conditions are described under pertinent sites.

IIIa. Silts and Generally Well-Drained Soils

Foundation and ground water conditions generally favorable.

IIIb. Clays and Generally Poorly-Drained Soils

Foundation and ground water conditions generally need special consideration. Local salt problems.

IV. Coastal and River Sands

The area is composed of sandy material deposited primarily by wave or river action. A few small areas of sand are deposited by wind. The topography varies from flat or gently sloping beaches to slightly undulating beach ridges and depressions. Excavation is easy. Drainage and foundation conditions are generally favorable. Certain special conditions are described under pertinent sites.

IVa. Beach Sand

Generally medium to fine sand with shell fragments, gently sloping to flat land adjacent and parallel to coast, well-drained and good foundation material.

IVb. Beach Ridges

Generally medium to fine sand with shell fragments, paralleling low ridges in coastal areas. Well-drained and good foundation soils. The depressions between ridges are filled with shallow deposits of silts, clays, and organic materials. (Some beach ridge areas are underlaid by less desirable flood plain deposits; special investigations should be undertaken for deep foundations.)

IVc. River Sand

Generally medium to fine sand, occasionally coarse sand, natural levees or river bars. Well-drained and favorable shallow foundation soils.

V. Tidal Flats, Clays, and Swamps

The area is composed of silts, clays, salts and/or organic materials. The topography is flat. Water table is near to or at surface and the area is sometimes submerged. Poor drainage and poor foundation material. Certain special

conditions are described under pertinent sites.

Va. Tidal Flats, Clays, and Swamps (Predominantly Low Land)

Vb. Tidal Flats, Clays, and Swamps (Predominantly Swamp)

B. Off-Shore Map Units

The map units designate conditions expected between sea level and a depth of about thirty feet.

A. Coral reef

B. Coral or other rock at shallow depths

C. Fine-textured sediments (primarily silts and clays)

D. Coarse-textured sediments (primarily sands)

C/A. Fine-textured sediments over coral reef

D/A. Coarse-textured sediments over coral reef

C/B. Fine-textured sediments over rock

D/B. Coarse-textured sediments over rock

C/D. Fine-textured sediments over coarse-textured sediments

W. Water depth greater than thirty feet

7. Conclusions and Recommendations:

A. A wealth of information regarding on-shore and off-shore physical features is available through a study of existing maps, charts, airphotos and a field reconnaissance.

B. The information is summarized in a series of maps in Part II of this report covering all sites proposed by the Ports Authority. All maps are prepared at the same scale of 1:20,000 to facilitate comparison. They will provide an over-all perspective of each site as a basis for systematic planning.

C. The advantages as well as disadvantages of each site are discussed in detail in Part II of this report. Potentially good locations for development in each site are also designated therein. The over-all conditions of those sites having relatively favorable physical features are listed below:

Port Sites	Remarks
2. Yabocua	Favorable on-shore and off-shore conditions
4. Cabullón and Ponce	Generally favorable; some coral and mud off-shore
5. Guayanilla	Generally favorable; some coral and mud off-shore
6. Guánica	Favorable on-shore and off-shore conditions
9. Mayagüez	Generally favorable; limited on-shore area
10. Añasco	Favorable on-shore and off-shore conditions

D. This report has to be relatively brief because of the size of areas covered. When future detailed study of specific sites warrants, a somewhat more detailed and refined information concerning pin-point locations could be obtained by a further review of the voluminous existing reference materials.

E. At this preliminary stage, a general subsurface investigation is not considered justifiable because it would not serve the useful purpose of increasing our present knowledge of the over-all port conditions. A limited

exploration program is suggested in certain locations as indicated on the maps of several sites in case those areas have to be considered seriously. Finally, a systematic probing and boring program should be undertaken to facilitate detailed designs when a project location becomes more well defined and limited to a smaller area.

8. Selected Bibliography*;

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Liang, T. and others: A Photo Analysis Key for the Determination of Ground Conditions, Cornell University - U. S. Naval Research Office Project, Land Form Ser., 6 Volumes, 1951.

U.S.G.S. Topographic Map Series.

U.S.C. & G.S. Hydrographic Chart Series.

U.S.G.S. Aerial Photographs 1:15,000 scale, 1951 series.

Mark Hurd Aerial Surveys, Inc., Minneapolis, Minnesota and San Juan, Puerto Rico, Aerial Photographs 1:4,800 scale, 1959 series.

*Note: Certain references pertaining to individual sites are listed under the description of each site.

PART II SPECIFIC SITES

1. Fajardo

Sources of Information: Topographic map, agricultural soil map, geologic map, 1:15,000 scale and 1:4,800 scale airphotos, 1:10,000 scale hydrographic chart; field reconnaissance, and communications from Mr. A. Dauway, Puerto Rico Ports Authority.

The on-shore area consists of hills as well as flat land. The hills are of tuffaceous shales and andesitic agglomerates and their residual soils. The flat land is composed of moderately well-drained fan and flood plain soils; there are also clays, swamps with high water table and some beach sands immediately adjacent to the coast.

The land area is relatively limited for development. North of the Rio Fajardo the hills extend to the water front in many places and the existing town occupies a major portion of the favorable flat ground. South of the river, low swampy land predominates although better soils are available inland.

Off-shore, the port is well protected from waves by reefs and islands. However, these protections together with the river deposition have resulted in an accumulation of deep fine-textured sediments in the harbor. It appears that considerable dredging of mud, with some sand and rock, would be necessary in developing this site.

In summary, the over-all physical condition is not favorable because of the limited on-shore area and the continuous deposition of mud by the river. Detailed information is shown in the accompanying map, Plate II.

PLATE II FAJARDO

Condensed Legend*

On-Shore Features

Map Units	General Engineering Characteristics		
	Excavation	Drainage	Foundation
I Rock & Residual Soil			
Ia Granite	Variable	Good	Good
Ib Limestone	Variable	Good	Good to Fair
Ic Tuff, Shale	Variable	Fair	Fair
Id Sandstone	Rock primarily	Good	Good
II Talus, Alluvial Cone & Fan			
IIo Talus	Easy	Good	Poor
IIa Alluvial Soils (related to Ia)	Medium to Easy	Fair to Good	Fair to Good
IIb Alluvial Soils (related to Ib)	Medium to Easy	Fair to Good	Fair to Good
IIc Alluvial Soils (related to Ic)	Medium to Easy	Fair to Good	Fair to Good
III Flood Plain			
IIIa Silts and Well-Drained Soils	Easy	Good	Good to Fair
IIIb Clays & Poorly-Drained Soils	Easy to Medium	Poor	Poor
IV Sand			
IVa Beach Sand	Easy	Good	Good
IVb Ridge Sand	Easy	Good	Good
IVc River Sand	Easy	Good	Good to Fair
V Tidal Area			
Va Low Land	Easy to Medium	Fair to Poor	Poor
Vb Swamp	Medium to Difficult	Poor	Very Poor

OFF-SHORE FEATURES

A Coral
B Coral or Rock
C Silts and Clays primarily
D Sands primarily
W Water depth greater than thirty feet

*Note: 1. For a more detailed description, see Part I of this report.
2. Compound symbols: A/B indicates A overlying B at relatively shallow depth.

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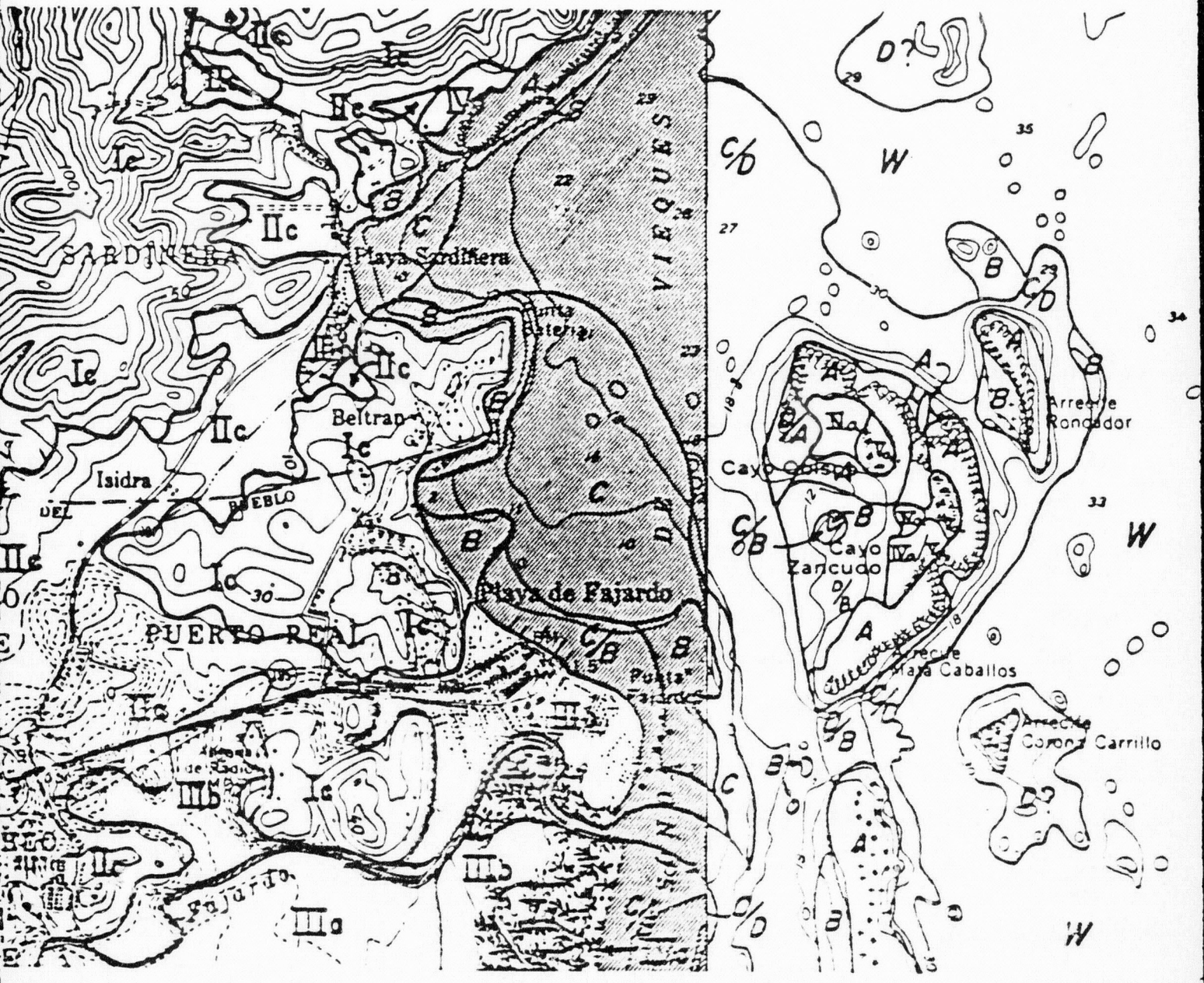

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I. FAJARDO

2. YABUCOA

Sources of Information: Topographic map, agricultural soil map, geologic map, 1:15,000 scale airphotos, 1:10,000 scale hydrographic chart; field reconnaissance.

The on-shore area consists of an extensive flat land bounded by granitic hills both on north and south. The granite hills are primarily responsible for the coarse-textured soils in this region. The flat land includes the sandy beach and beach ridges along the coast and the broad flood plain of sandy and silty soils immediately inland. The sandy soils are generally satisfactory for barrow material as well as for foundations. Thus, both from topographic and engineering soils considerations, the land area is favorable for development.

Off-shore, the port is fairly well-protected by islands, yet the wave is vigorous enough to carry away most of the fine-textured sediments. It appears that most of the dredged material required would be sandy; small quantity of rock is expected in scattered locations.

In summary, the site is generally favorable both from on-shore and off-shore considerations. Detailed information as well as potential development area are indicated in the accompanying map, Plate III.

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PLATE III YABUCOA

Condensed Legend*

E 387

On-Shore Features

Map Units	General Engineering Characteristics		
	Excavation	Drainage	Foundation
I Rock and Residual Soil			
Ia Granite	Variable	Good	Good
Ib Limestone	Variable	Good	Good to Fair
Ic Tuff, Shale	Variable	Fair	Fair
Id Sandstone	Rock primarily	Good	Good
II Talus, Alluvial Cone and Fan			
IIc Talus	Easy	Good	Poor
IIa Alluvial Soils (related to Ia)	Medium to Easy	Fair to Good	Fair to Good
IIb Alluvial Soils (related to Ib)	Medium to Easy	Fair to Good	Fair to Good
IIc Alluvial Soils (related to Ic)	Medium to Easy	Fair to Good	Fair to Good
III Flood Plain			
IIIa Silts & well-drained Soils	Easy	Good	Good to Fair
IIIa*IIIa over granular soils	Easy	Good	Good
IIIb Clays and poorly-drained Soils	Easy to Medium	Poor	Poor
IV Sand			
IVa Beach Sand	Easy	Good	Good
IVb Ridge Sand	Easy	Good	Good
IVc River Sand	Easy	Good	Good to Fair
V Tidal Area			
Va Low land	Easy to Medium	Fair to Poor	Poor
Vb Swamp	Medium to Difficult	Poor	Very Poor
Vb* Peat & organic soils	Medium	Poor	Poor

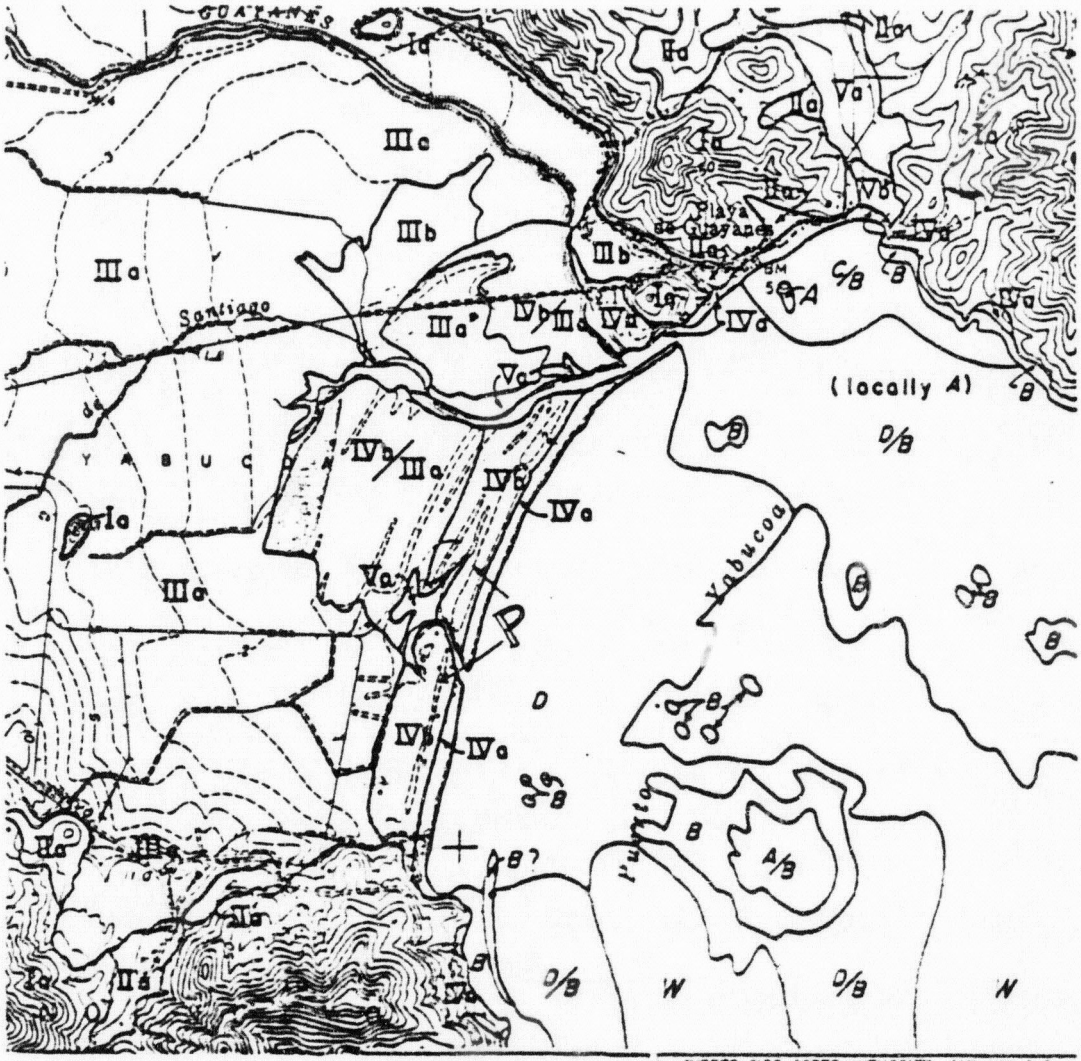
Off-Shore Features

A Coral
B Coral or Rock
C Silts and Clays primarily
D Sands primarily
W Water depth greater than thirty feet

Recommendations

P Potential Area for Port Development

*Note: 1. For a more detailed description see Part I of this report.
2. Compound symbols: A/B indicates A overlying B at relatively shallow depth.



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3. Jobos and Aguirre

Sources of Information: Topographic map, agricultural soil map, geologic map, 1:15.000 scale airphotos, 1:20,000 scale hydrographic chart; field reconnaissance, and communications from Gahagan Overseas Dredging Company.

The on-shore area consists of fan and flood plain soils with extensive swamps, salt flats and some beach sands along the coast. There is an igneous rock hill situated directly west of the town of Central Aguirre.

Off-shore, the area is well protected from waves by coral islands. Conditions of sediments are variable; the sediments are generally deep and poor.

The Jobos Bay is very shallow, filled with fine-textured sediments. Most of the Bay is surrounded by low, swampy land except at Point Pozuelo area where extensive beach sand developed. Because of its sandy soil and favorable approach from sea, Point Pozuelo area itself might provide a good possibility for development and is so indicated in the accompanying map.

In Central Aguirre, the on-shore topography varies from rolling to hilly; the harbor is muddy but becomes more sandy toward the sea. Between the harbor and the sea, there is a chain of coral islands with patches of sand on top of them.

West of central Aguirre, there is an extensive area of swamps and salt flats, although a narrow band of beach sand developed along the coast. Mud and some rock are expected directly off-shore. A relatively deep sandy channel is reported between these mud areas and the coral chain toward the sea. Development along the coastal area at Mar Negro and vicinity is a possibility. If such a development is contemplated, a limited probing to ascertain bay bottom conditions directly adjacent to shore would be desirable. This area is also indicated in the accompanying map.

In summary, the over-all physical condition of this general area is not favorable because of the swampy low land on-shore and the deep mud bottom off-shore. However, if because of economic reasons, serious consideration for port development is required in this location, then the Point Pozuelo and Mar Negro areas should be further explored and a limited probing program executed. Detailed information is shown in the accompanying map, Plate IV, which also indicates potential port and probing locations.

PLATE IV Jobos and Aguirre

PLATE IV Jobos and Aguirre

Condensed Legend*

On-Shore Features

Map Units	General Engineering Characteristics		
	Excavation	Drainage	Foundation
I Rock and Residual Soil			
Ia Granite	Variable	Good	Good
Ib Limestone	Variable	Good	Good to Fair
Ic Tuff, Shale	Variable	Fair	Fair
Id Sandstone	Rock primarily	Good	Good
II Talus, Alluvial Cone & Fan			
IIo Talus	Easy	Good	Poor
IIa Alluvial Soils (related to Ia)	Medium to Easy	Fair to Good	Fair to Good
IIb Alluvial Soils (related to Ib)	Medium to Easy	Fair to Good	Fair to Good
IIc Alluvial Soils (related to Ic)	Medium to Easy	Fair to Good	Fair to Good
III Flood Plain			
IIIa Silts and well-drained Soils	Easy	Good	Good to Fair
IIIa* IIIa over granular Soils	Easy	Good	Good
IIIb Clays and poorly-drained Soils	Easy to Medium	Poor	Poor
IV Sand			
IVa Beach Sand	Easy	Good	Good
IVb Ridge Sand	Easy	Good	Good
IVc River Sand	Easy	Good	Good to Fair
IVc* Shallow silt over granular Soils	Easy	Good	Good to Fair
V Tidal Area			
Va Low land	Easy to Medium	Fair to Poor	Poor
Vb Swamp	Medium to Difficult	Poor	Very Poor

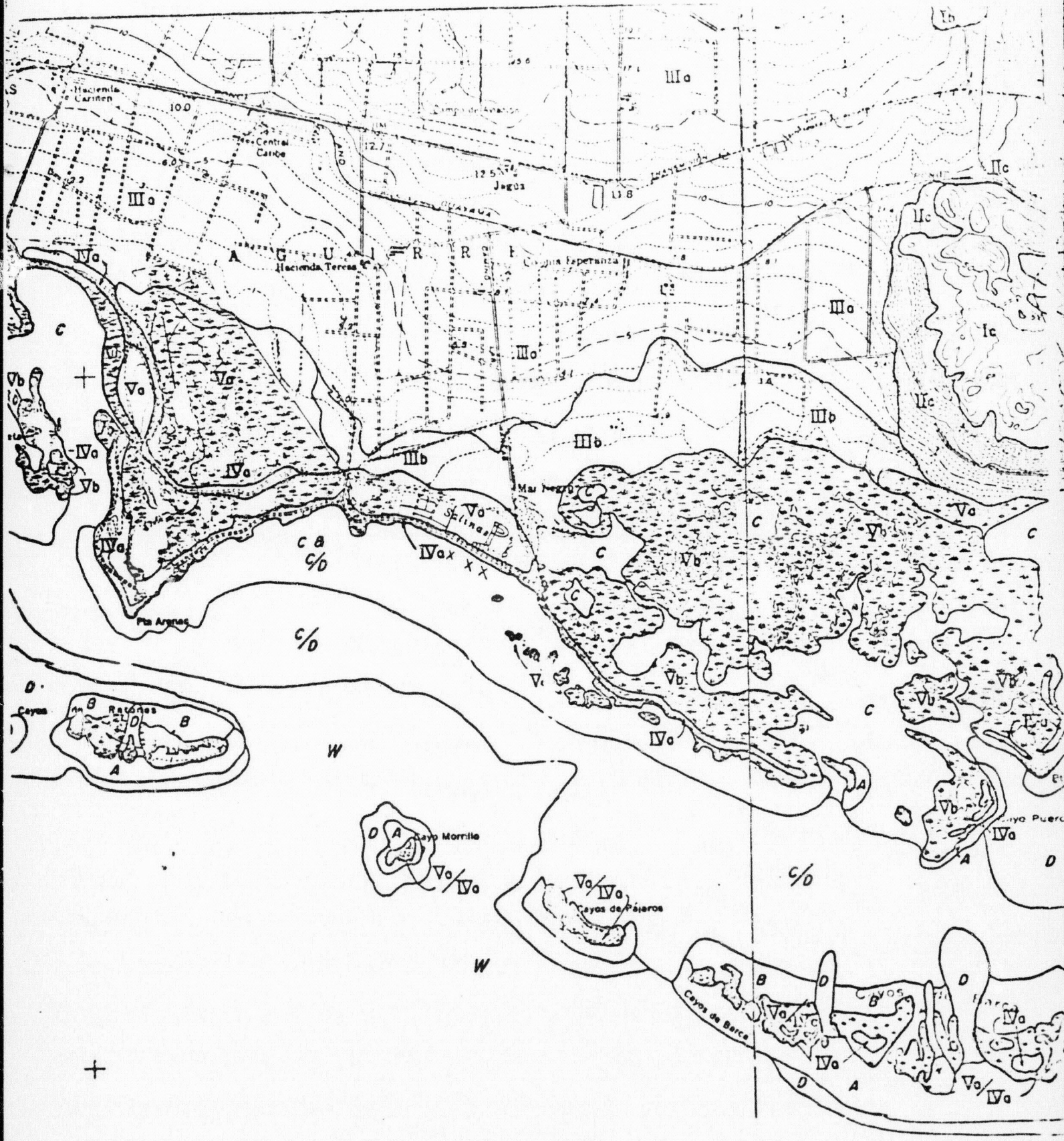
Off-Shore Features

A Coral
B Coral or Rock
C Silts and Clays primarily
D Sands primarily
W Water depth greater than thirty feet

Recommendations

P Potential Area for Port Development
x General Location for Limited Probing Program

*Note: 1. For a more detailed description see Part I of this report.
2. Compound symbols: A/B indicates A overlying B at relatively shallow.



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PORT SITES INVESTIGATION

3. JOBOS AND AGUIRR

SCALE 1:20000 DEC 1960 PLATE 12 of

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4. Cabullon and Ponce

Sources of Information: Topographic map, agricultural soil map, geologic map, 1:15,000 scale and 1:4,800 scale airphotos, 1:20, 000 hydrographic chart; field reconnaissance, Central Mercedita soils reports by Mr. R. Prann and by Foundation Company of Puerto Rico and communications from Mr. A. Dauway, Puerto Rico Ports Authority.

The on-shore area consists of a broad flood plain of well-drained silts and an extensive beach ridges deposit of sands parelleling the coast. There are minor swampy areas.

Off-shore, the area is protected by a series of coral reefs. Sediment conditions vary within short distances as indicated on the map. Mud bottoms are located behind reefs, close to river mouths and swamps or other quiet water zones whereas sand bottoms are found close to beachs and areas where wave action is strong. Submerged corals are encountered in scattered areas but would not be a major item in dredging.

Generally, the Cabullon area has favorable on-shore and off-shore features for development. Poor soil areas are warned on the map. In the Ponce port area, mud bottom and certain poor on-shore soils in its immediate vicinity have limited the development there. However, there is a possibility of developing an area east of the existing port area.

In summary, the overall on-shore and off-shore features at Cabullon are generally favorable except that there are corals and muds at certain off-shore locations. Detailed information as well as potential development areas and suggested probings are indicated in the accompanying map, Plate V.

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PLATE V CABULLÓN AND PONCE

Condensed Legend* 28.a

On-Shore Features

Map Units	General Engineering Characteristics		
	Excavation	Drainage	Foundation
I Rock and Residual Soil			
Ia Granite	Variable	Good	Good
Ib Limestone	Variable	Good	Good to Fair
Ic Tuff, Shale	Variable	Fair	Fair
Id Sandstone	Rock Primarily	Good	Good
II Talus, Alluvial Cone & Fan			
IIo Talus	Easy	Good	Poor
IIa Alluvial Soils (related to Ia)	Medium to Easy	Fair to Good	Fair to Good
IIb Alluvial Soils (related to Ib)	Medium to Easy	Fair to Good	Fair to Good
IIc Alluvial Soils (related to Ic)	Medium to Easy	Fair to Good	Fair to Good
III Flood Plain			
IIIa Silts & well-drained Soils	Easy	Good	Good to Fair
IIIb Clays & poorly-drained Soils	Easy to Medium	Poor	Poor
IV Sand			
IVa Beach sand	Easy	Good	Good
IVa**, primarily Corals & Shells	Easy	Good	Fair
IVb Ridge Sand	Easy	Good	Good
IVc River Sand	Easy	Good	Good to Fair
V Tidal Area			
Va Low Land	Easy to Difficult	Fair to Poor	Poor
Vb Swamp	Medium to Difficult	Poor	Very Poor

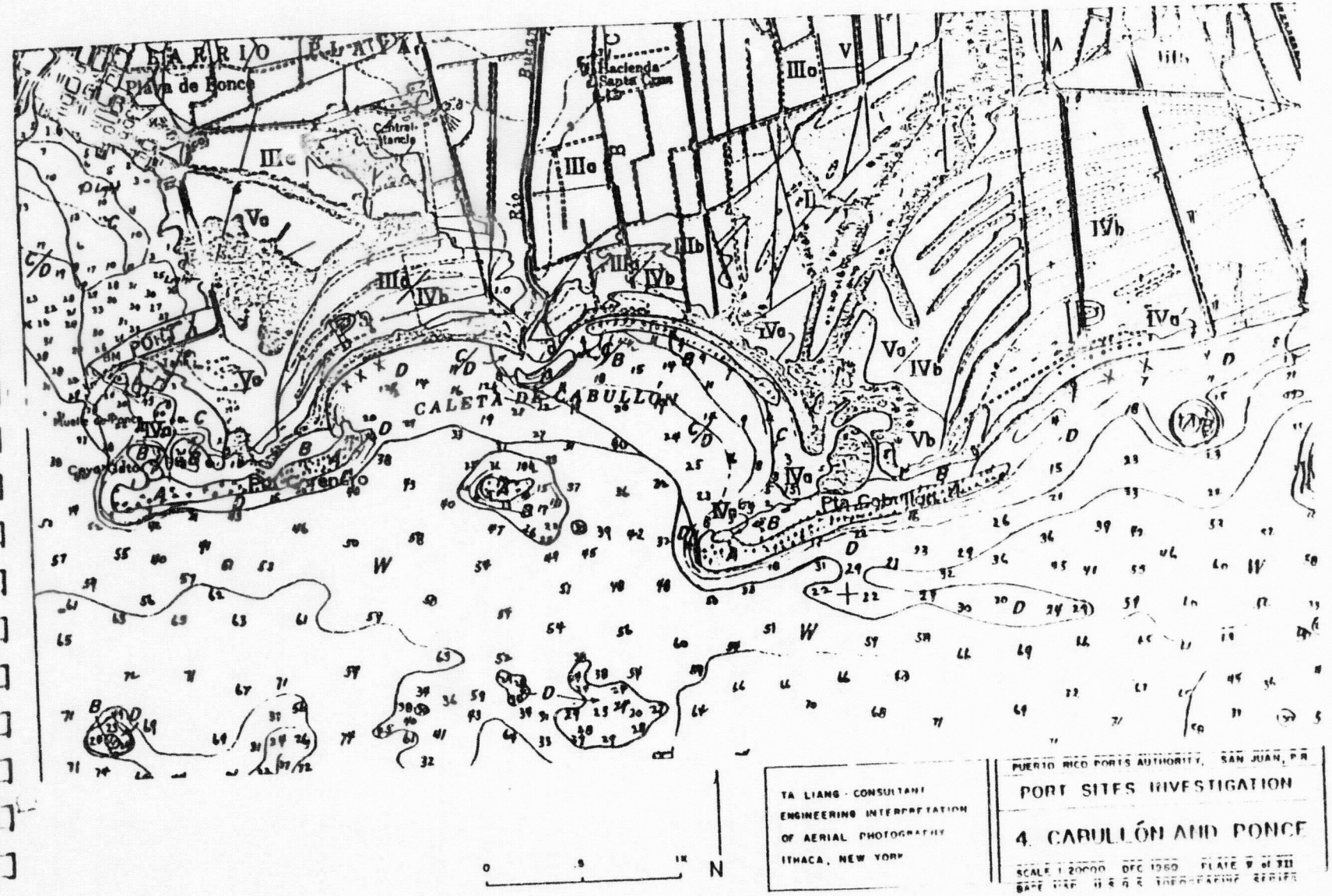
Off-Shore Features

A Coral
B Coral or Rock
C Silts and Clays primarily
D Sands primarily
W Water depth greater than thirty feet

Recommendations

P Potential Area for Port Development
x General Location for Limited Probing Program

*Note: 1. For a more detailed description see Part I of this report
2. Compound symbols: A/B indicates A overlying B at relatively shallow depth.



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PORT SITES INVESTIGATION

4. CABULLÓN AND PONCE

SCALE 1:20000 DEC 1960 PLATE 9 of XII

BASE MAP U.S.G.S. TOPOGRAPHIC SERIES

E 400

5. Guayanilla

Sources of Information: Topographic map, agricultural soil map, geologic map, 1:15,000 scale airphotos, 1:10,000 scale hydrographic chart; field reconnaissance, communications from Gahagan Overseas Dredging Company.

The on-shore area consists of limestone hills, well-drained fans and flood plains and coastal swamps. At the east wing, Punta Guayanilla, there is a prominent development of sandy beach ridges along the coast.

The off-shore conditions are variable. In the middle portion of the harbor, where the waves are active, there is a sandy bottom. At Puerto de Guayanilla, the western bay, there is an accumulation of deep fine-textured sediments. In both the west and east outlying areas of shallow and relatively quiet waters, there are fine-textured soils overlying rock. Many coral reefs and islands scattered throughout the off-shore regions of the coast. However, navigation would not be difficult.

In summary, the area is a natural, well-protected harbor. Furthermore, both on-shore and off-shore features are generally favorable for development in the vicinity of Playa de Guayanilla and in Ponta Guayanilla area; a special point for consideration is the coral and mud deposit at certain locations off-shore. A limited probing program should be undertaken in the off-shore locations immediately adjacent to the above mentioned land areas prior to detailed planning. Detailed information and the potential development areas are shown in the accompanying map, Plate VI.

PLATE VI GUAYANILLA

Condensed Legend*

On-Shore Features

Map Units	General Engineering Characteristics		
	Excavations	Drainage	Foundation
I Rock and Residual Soil			
Ia Granite	Variable	Good	Good
Ib Limestone	Variable	Good	Good to Fair
Ic Tuff, Shale	Variable	Fair	Fair
Id Sandstone	Rock primarily	Good	Good
II Talus, Alluvial Cone & Fan			
IIc Talus	Easy	Good	Poor
IIa Alluvial Soils (Related to Ia)	Medium to Easy	Fair to Good	Fair to Good
IIb Alluvial Soils (Related to Ib)	Medium to Easy	Fair to Good	Fair to Good
IIc Alluvial Soils (related to Ic)	Medium to Easy	Fair to Good	Fair to Good
III Flood Plain			
IIIa Silts and well-drained Soils	Easy	Good	Good to Fair
IIIb Clays and poorly-drained Soils	Easy to Medium	Poor	Poor
IV Sand			
IVa Beach Sand	Easy	Good	Good
IVa**IVa, primarily Corals & Shells	Easy	Good	Fair
IVb Ridge Sand	Easy	Good	Good
IVc River Sand	Easy	Good	Good to Fair
V Tidal Area			
Va Low land	Easy to Medium	Fair to Poor	Poor
Vb Swamp	Medium to Difficult	Poor	Very Poor

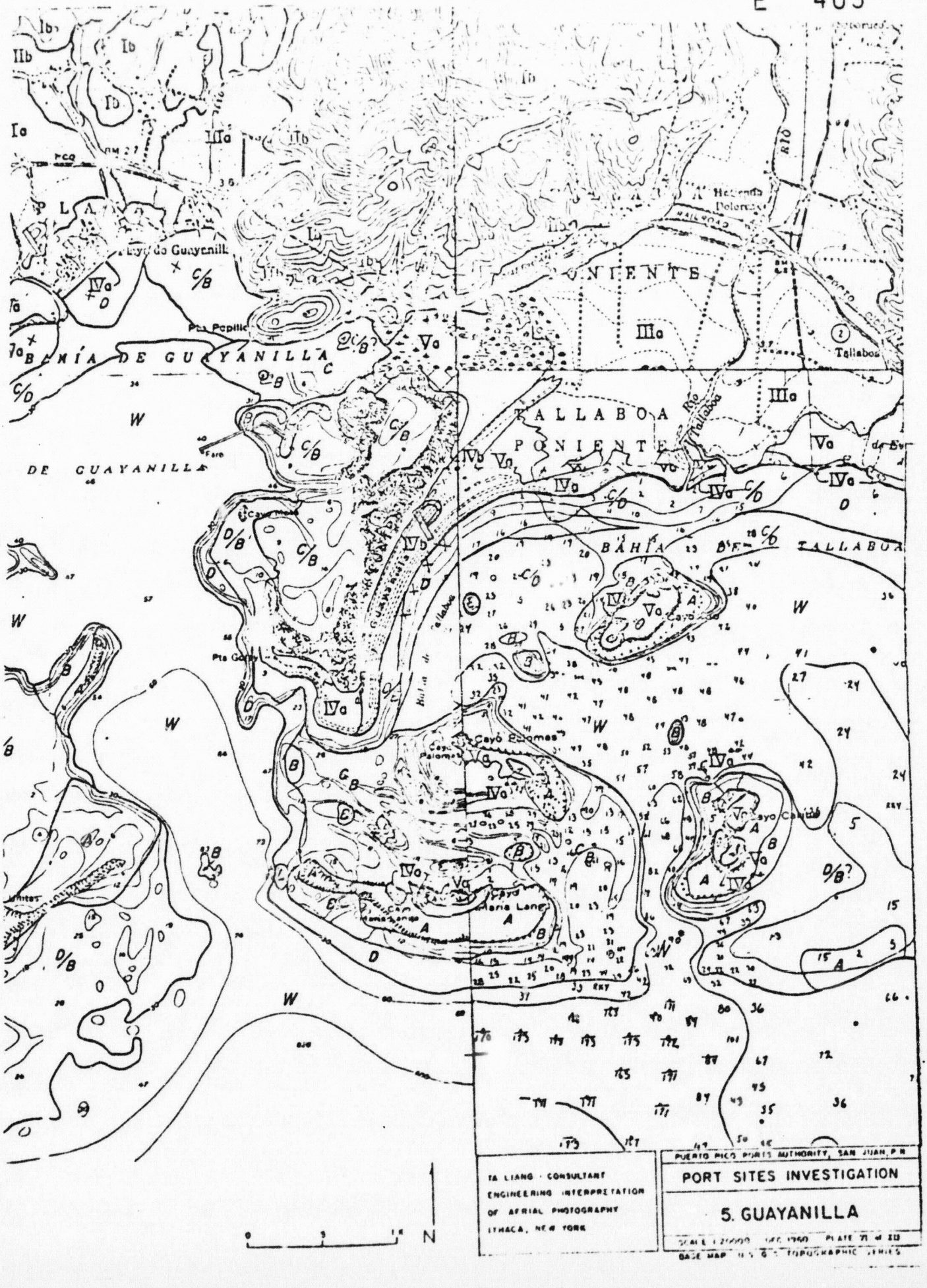
Off-Shore Features

A Coral
B Coral or Rock
C Silts and Clays primarily
D Sands primarily
W Water depth greater than thirty feet

Recommendations

P Potential Area for Port Development
x General Location for Limited Probing Program

*Note: 1. For a more detailed description see Part I of this report.
2. Compound symbols: A/B indicates A overlying B at relatively shallow depth.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TALLABOA
BAHÍA
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Cayo Conejo
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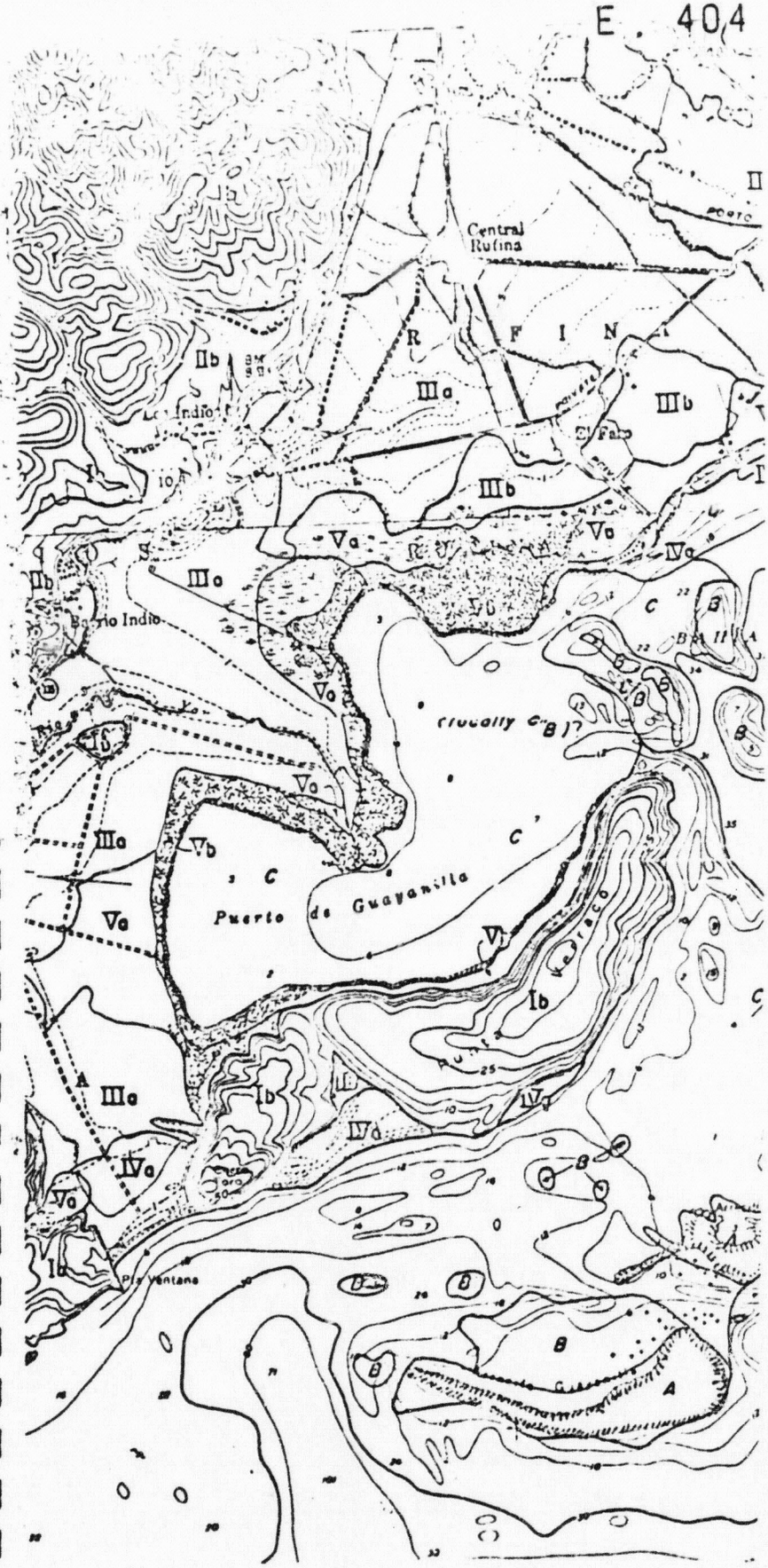
SCALE 1:20000 DEC. 1960 PLATE 71 of 213
BASE MAP U.S.G.S. TOPOGRAPHIC SERIES


Central Rufina
R F I N
Barrio Indio
Puerto de Guayanilla
Crucolly
Pta Ventana
IIb
IIIa
IIIb
Va
Vb
Vc
IVa
Ib
VIa

6. Guánica

Sources of Information: Topographic map, agricultural soil map, geologic map, 1:15,000 scale and 1:4,800 scale airphotos, 1:10,000 scale hydrographic chart; field reconnaissance, and communications from Gahagan Overseas Dredging Company and from Mr. A. Dauway, Puerto Rico Ports Authority.

The on-shore area consists of limestone hills, fans and flood plains of well- to poorly- drained soils and some swamps. There are talus slopes with relatively deep soil at the foot of certain limestone hills. Although the land is limited by hills and existing establishments, there is still ample space and reasonably good land for development.

The off-shore features are particularly favorable. There are a number of coral islands providing good protection from the sea. The harbor channel is generally deep and sandy, with the exception of the areas near to the Central and toward the end of the Bay where fine-textured soils are accumulated to great depths. There are some rocks at shallow depths in scattered areas as indicated in the map. Corals and varying sediment conditions in the outer bay areas are also indicated.

In summary, the area is a natural harbor. Both on-shore and off-shore conditions are favorable. The area at the vicinity of Playa de Guanica offers specially good possibilities. The dredged material there is expected to be sandy and could be used to fill the adjacent coastal lowland. A limited probing program in the waters in front of the Playa should be undertaken prior to detailed design. A small area along the southwest shore of the Bay is also suggested for consideration. Detailed information as well as potential development areas and suggested probings are indicated in the accompanying map, Plate VII.

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PLATE VII GUÁNICA

CONDENSED LEGEND*

On-Shore Features

Map Units	General Engineering Characteristics		
	Excavation	Drainage	Foundation
I Rock and Residual Soil			
Ia Granite	Variable	Good	Good
Ib Limestone	Variable	Good	Good to Fair
Ib* Ib, Harder Limestone	Variable	Good	Good
Ib**Ib*, Deep soil	Easy	Good to Fair	Good to Fair
Ic Tuff, Shale	Variable	Fair	Fair
Id Sandstone	Rock primarily	Good	Good
II Talus, Alluvial Cone & Fan			
IIo Talus	Easy	Good	Poor
IIa Alluvial Soils (Related to Ia)	Medium to Easy	Fair to Good	Fair to Good
IIb Alluvial Soils (Related to Ib)	Medium To Easy	Fair to Good	Fair to Good
IIc Alluvial Soils (Related to Ic)	Medium to Easy	Fair to Good	Fair to Good
III Flood Plain			
IIIa Silts and well-drained Soils	Easy	Good	Good to Fair
IIIa* IIIa over granular soils	Easy	Good	Good
IIIb Clays and poorly-drained Soils	Easy to Medium	Poor	Poor
IV Sand			
IVa Beach Sand	Easy	Good	Good
IVb Ridge Sand	Easy	Good	Good
IVc River Sand	Easy	Good	Good to Fair
V Tidal Area			
Va Low land	Easy to Medium	Fair to Poor	Poor
Vb Swamp	Medium to Difficult	Poor	Very Poor

Off-Shore Features

A Coral
B Coral or Rock
C Silts and Clays primarily
D Sands Primarily
W Water depth greater than thirty feet

Recommendations

P Potential Area for Port Development
x General Location for Limited Probing Program

*Note: 1. For a more detailed description see Part I of this report.
2. Compound symbols: A/B indicates A overlying B at relatively shallow depth.

CONDENSED LEGEND*

On-Shore Features

Map Units	General Engineering Characteristics		
	Excavation	Drainage	Foundation
I Rock and Residual Soil			
Ia Granite	Variable	Good	Good
Ib Limestone	Variable	Good	Good to Fair
Ib* Ib, Harder Limestone	Variable	Good	Good
Ib**Ib*, Deep soil	Easy	Good to Fair	Good to Fair
Ic Tuff, Shale	Variable	Fair	Fair
Id Sandstone	Rock primarily	Good	Good
II Talus, Alluvial Cone & Fan			
IIo Talus	Easy	Good	Poor
IIa Alluvial Soils (Related to Ia)	Medium to Easy	Fair to Good	Fair to Good
IIb Alluvial Soils (Related to Ib)	Medium To Easy	Fair to Good	Fair to Good
IIc Alluvial Soils (Related to Ic)	Medium to Easy	Fair to Good	Fair to Good
III Flood Plain			
IIIa Silts and well-drained Soils	Easy	Good	Good to Fair
IIIa* IIIa over granular soils	Easy	Good	Good
IIIb Clays and poorly-drained Soils	Easy to Medium	Poor	Poor
IV Sand			
IVa Beach Sand	Easy	Good	Good
IVb Ridge Sand	Easy	Good	Good
IVc River Sand	Easy	Good	Good to Fair
V Tidal Area			
Va Low land	Easy to Medium	Fair to Poor	Poor
Vb Swamp	Medium to Difficult	Poor	Very Poor

Off-Shore Features

A Coral
B Coral or Rock
C Silts and Clays primarily
D Sands Primarily
W Water depth greater than thirty feet

Recommendations

P Potential Area for Port Development
x General Location for Limited Probing Program

*Note: 1. For a more detailed description see Part I of this report.
2. Compound symbols: A/B indicates A overlying B at relatively shallow depth.

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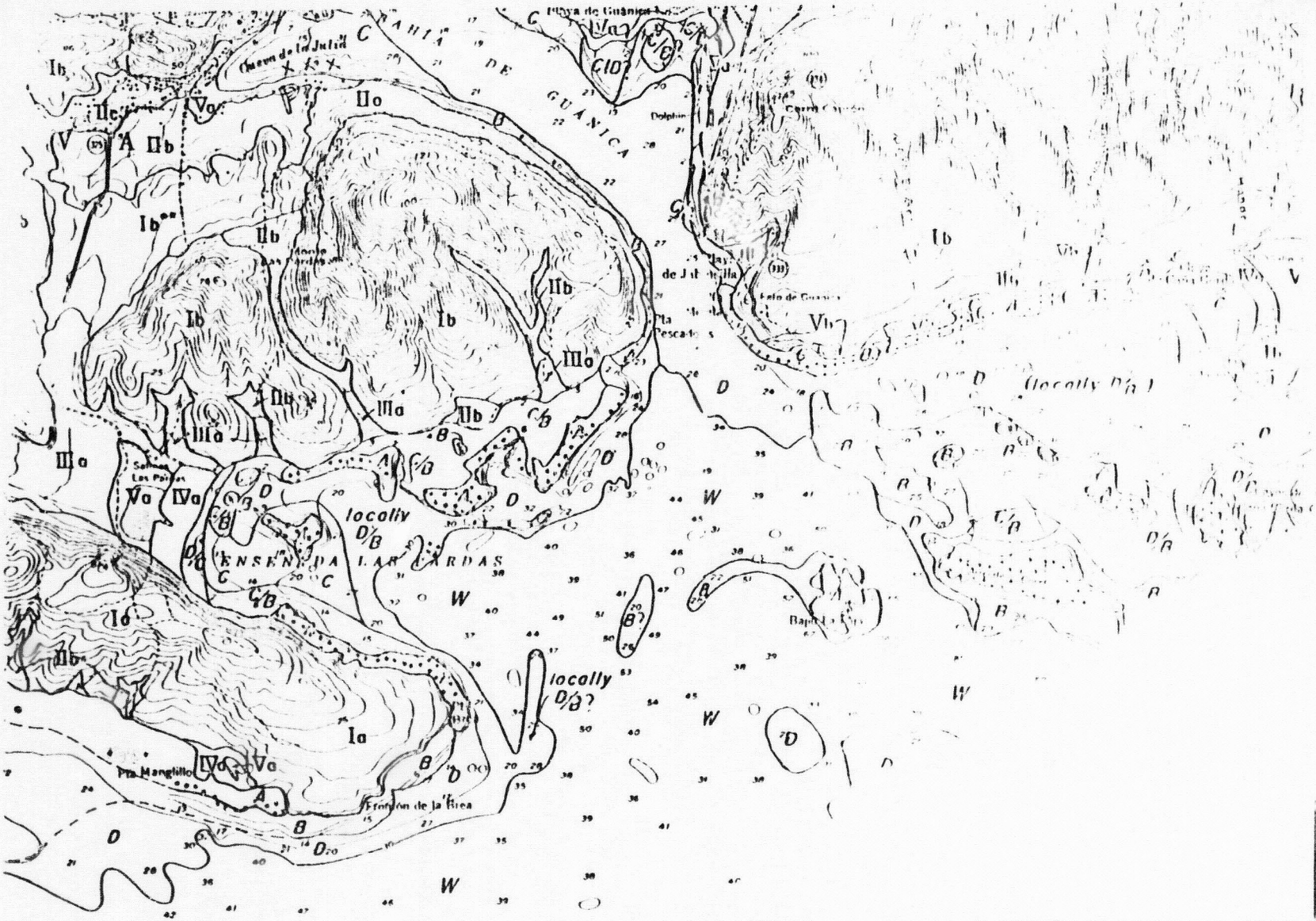

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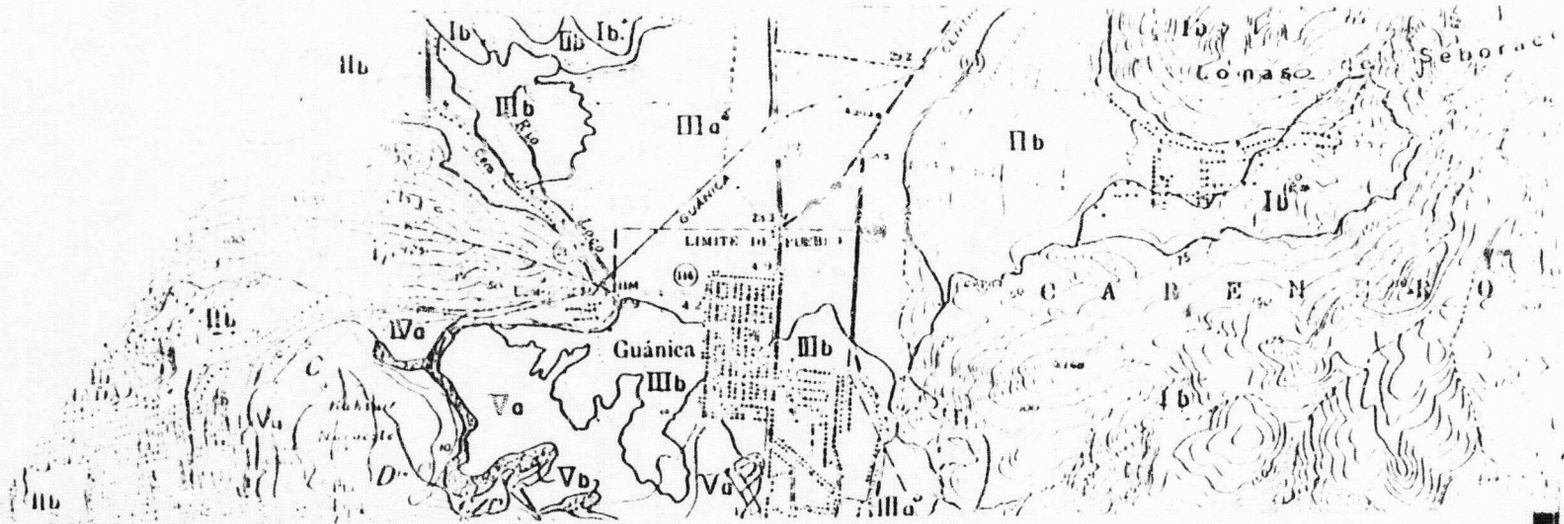
PORT SITES INVESTIGATION

G. GUÁNICA



E 410

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E 411

7. Boqueron

Sources of Information: Topographic map, agricultural soil map, geologic map, 1:15,000 scale airphotos, 1:10,000 hydrographic chart; field reconnaissance.

The on-shore area consists of limestone, tuffaceous rock and sandstone hills, low flood plains, and a coastal belt of beach sands.

Off-shore, a considerable portion of the harbor is filled with deep deposits of fine-textured sediments. There are scattered rock areas in the harbor along the shoreline. At the harbor mouth, thereis a major rocky barrier with a narrow channel; area of relatively deep water is located on both sides of the barrier.

In summary, the overall condition of the on-shore and off-shore features of this site is not favorable. Generally, where the water is deep, the land is either limited by topography or of poor soil where the land area is favorable, the water is shallow and the harbor is filled with mud, requiring extensive dredging. If for some reason that this site has to be developed, consideration may be given to the south side of the outer bay area and further investigations has to be undertaken. Detailed information is indicated in the accompanying map, Plate VII.

PLATE VIII Boquerón

Condensed Legend*

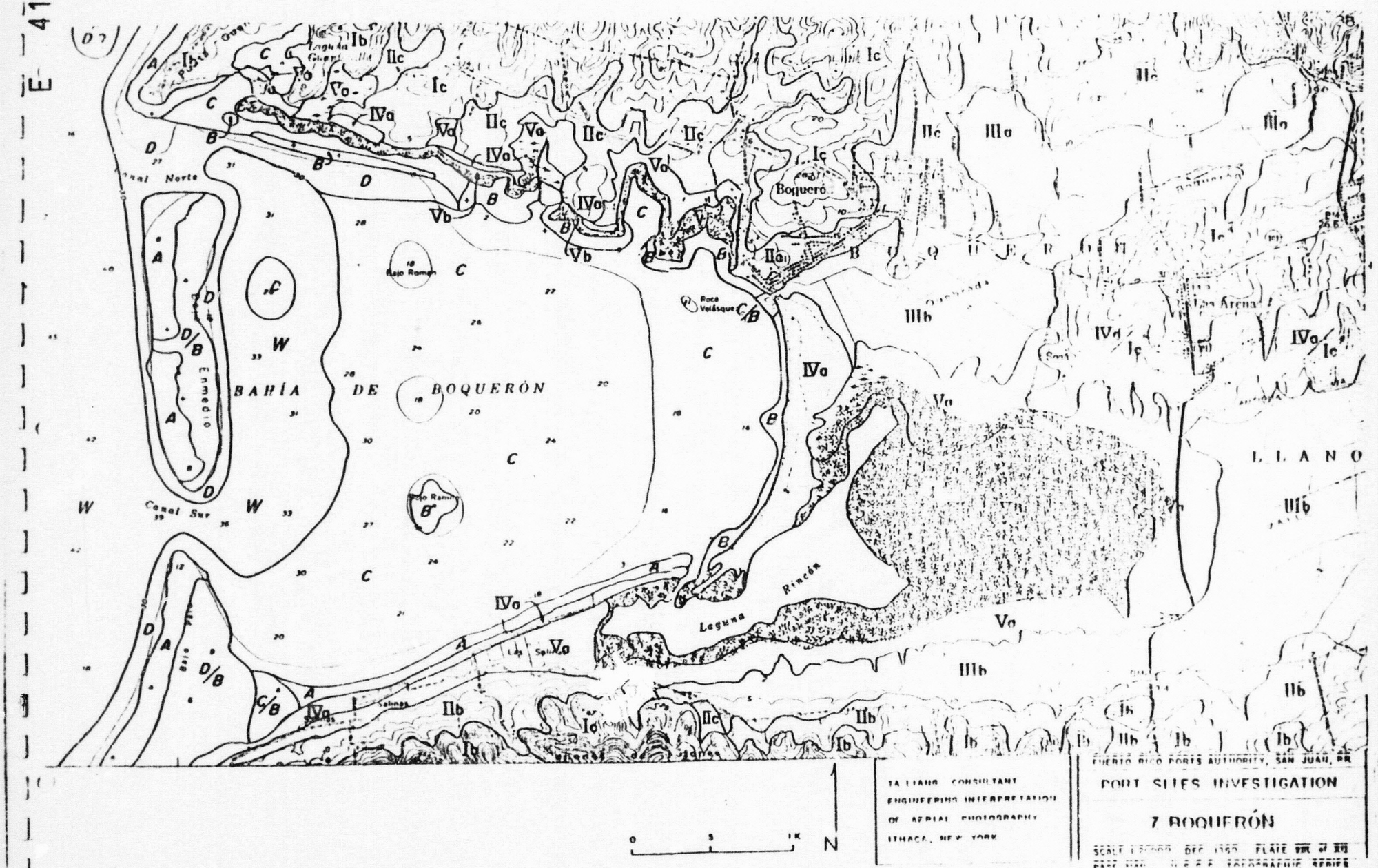
On-Shore Features

Map Units	General Engineering Characteristics		
	Excavation	Drainage	Foundation
I Rock and Residual Soil			
Ia Granite	Variable	Good	Good
Ib Limestone	Variable	Good	Good to Fair
Ic Tuff, Shale	Variable	Fair	Fair
Ic* Ic, Deep silt and clay	Easy to Medium	Poor to Fair	Poor to Fair
Id Sandstone	Rock primarily	Good	Good
II Talus, Alluvial Cone & Fan			
IIc Talus	Easy	Good	Poor
IIa Alluvial Soils (related to Ia)	Medium to Easy	Fair to Good	Fair to Good
IIb Alluvial Soils (related to Ib)	Medium to Easy	Fair to Good	Fair to Good
IIc Alluvial Soils (related to Ic)	Medium to Easy	Fair to Good	Fair to Good
III Flood Plain			
IIIa Silts & well-drained Soils	Easy	Good	Good to Fair
IIIb Clays & poorly-drained Soils	Easy to Medium	Poor	Poor
IV Sand			
IVa Beach Sand	Easy	Good	Good
IVb Ridge Sand	Easy	Good	Good
IVc River Sand	Easy	Good	Good to Fair
V Tidal Area			
Va Low land	Easy to Medium	Fair to Poor	Poor
Vb Swamp	Medium to Difficult	Poor	Very Poor

Off-Shore Features

A Coral
B Coral or Rock
C Silts and Clays Primarily
D Sands primarily
W Water depth greater than thirty feet

*Note: 1. For a more detailed description see Part I of this report.
2. Compound Symbols: A/B indicates A overlying B at relatively shallow depth.


BAHÍA DE BOQUERÓN
Canal Norte
Canal Sur
Enmedio
Roca Velásquez
Boquerón
Laguna
Rincón
Salinas
LLANO
0 1 2K
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ITHACA, NEW YORK
PUERTO RICO PORTS AUTHORITY, SAN JUAN, PR.
PORT SITES INVESTIGATION
7 BOQUERÓN

8. Puerto Real

E 415

Sources of Information: Topographic map, agricultural soil map, geologic map, 1:15,000 scale airphotos, 1:20,000 scale hydrographic chart; field reconnaissance.

The on-shore area consists of tuffaceous rock and limestone hills, low flood plains and swamps. There is a narrow band of sand at scattered coastal area.

Off-shore, the water in the harbor is very shallow and filled with fine-textured sediments. There is a rocky barrier at the entrance of the bay and an extensive coral reef growth along the exterior coast.

In summary, the overall condition of this site is not favorable because of the shallow water and poor material in the harbor, the rock barrier, and the limited land possibilities. Detailed information is given in the accompanying map, Plate IX.

PLATE IX Puerto Real

CONDENSED LEGEND*

On-Shore Features

Map Units	General Engineering Characteristics		
	Excavation	Drainage	Foundation
I Rock and Residual Soil			
Ia Granite	Variable	Good	Good
Ib Limestone	Variable	Good	Good to Fair
Ic Tuff, Shale	Variable	Fair	Fair
Ic* Ic, Deep silt and clay	Easy to Medium	Poor to Fair	Poor to Fair
Id Sandstone	Rock primarily	Good	Good
II Talus, Alluvial Cone & Fan			
IIo Talus	Easy	Good	Poor
IIa Alluvial Soils (related to Ia)	Medium to Easy	Fair to Good	Fair to Good
IIb Alluvial Soils (related to Ib)	Medium to Easy	Fair to Good	Fair to Good
IIc Alluvial Soils (related to Ic)	Medium to Easy	Fair to Good	Fair to Good
III Flood Plain			
IIIa Silts and well-drained Soils	Easy	Good	Good to Fair
IIIb Clays and poorly-drained Soils	Easy to Medium	Poor	Poor
IV Sand			
IVa Beach Sand	Easy	Good	Good
IVb Ridge Sand	Easy	Good	Good
Ivc River Sand	Easy	Good	Good to Fair
V Tidal Area			
Va Low land	Easy to Medium	Fair to Poor	Poor
Vb Swamp	Medium to Difficult	Poor	Very Poor

Off-Shore Features

A Coral
B Coral or Rock
C Silts and Clays primarily
D Sands primarily
W Water depth greater than thirty feet

*Note: 1. For a more detailed description see Part I of this report
2. Compound symbols: A/B indicates A overlying B at relatively shallow depth

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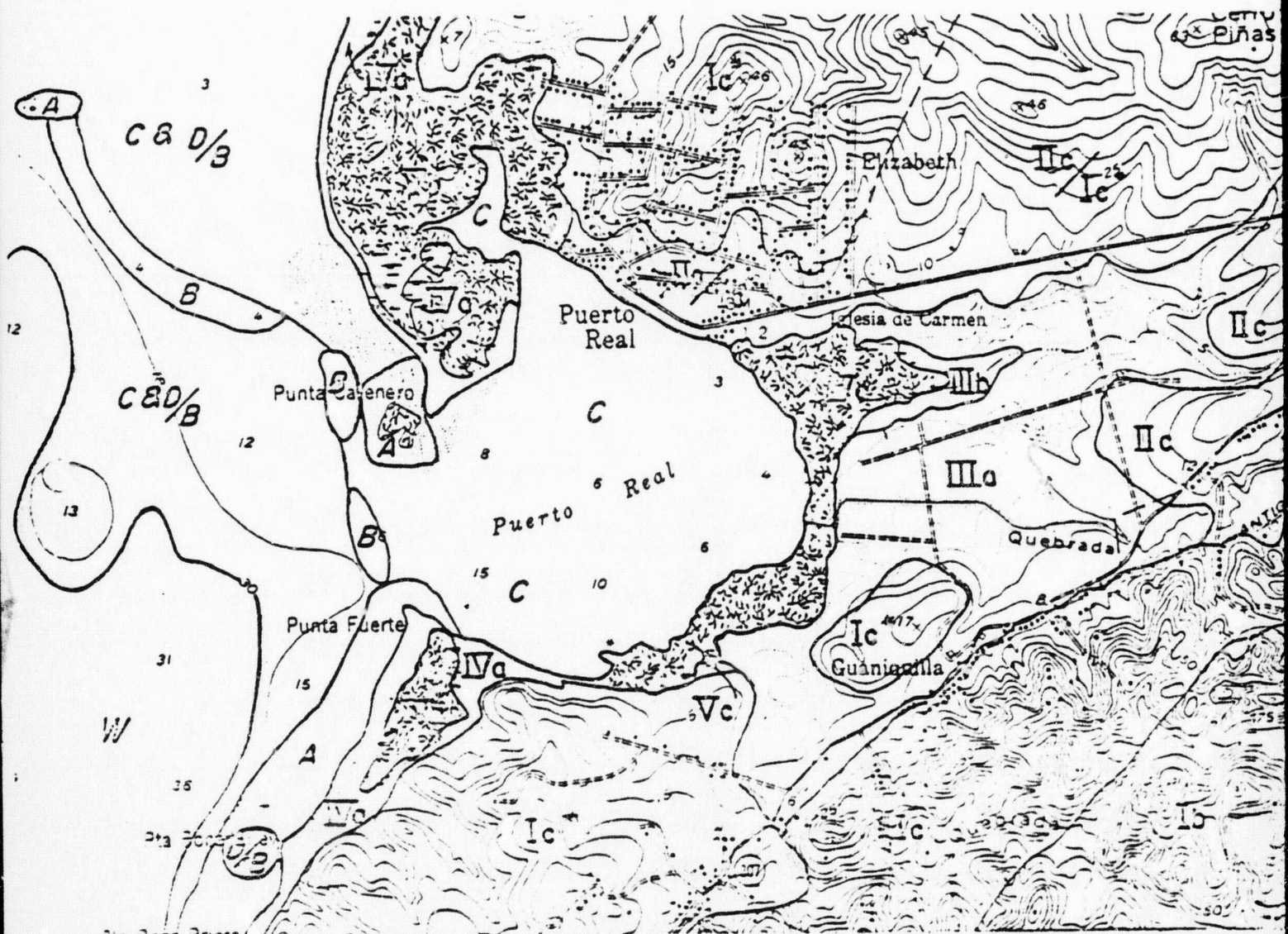

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PORT SITES INVESTIGATION

8. PUERTO REAL

SCALE 1:20000 DEC 1960 PLATE II of III

BASE MAP U.S.I.S. TOPOGRAPHIC SHEET

9. Mayaguez

Sources of Information: Topographic map, agricultural soil map, geologic map, 1:15,000 scale and 1:4,800 scale airphotos, 1:15,000 scale hydrographic chart; field reconnaissance, and communications from Gahagan Overseas Dredging Company.

The on-shore area consists of hills of volcanic materials, somewhat metamorphosed, and a narrow coastal strip of flat land. The flat land soils are generally satisfactory although the areal extent is rather small.

Off-shore, the sea bottom provides one of the best sources of sand and gravel in the Island. Locally there are some rocks buried at various depths. The depth to rock in the coastal area currently being dredged (for instance, the Star-Kist site) is in the order of about twenty-five feet. The dredged sand and gravel has been used most satisfacorily for fills at industrial sites. Off-shore protection from waves is generally favorable and there is no difficulty in navigation.

In summary, the overall condition of the physical features of this site is favorable, the major drawback being that the on-shore land development would be limited by topography. Detailed information as well as potential development area and suggested probings are indicated in the accompanying map, Plate X.

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PLATE X Mayáğuez

Condensed Legend*

On-Shore Features

Map Units	General Engineering Characteristics		
	Excavation	Drainage	Foundation
I Rock and Residual Soil			
Ia Granite	Variable	Good	Good
Ib Limestone	Variable	Good	Good to Fair
Ic Tuff, Shale	Variable	Fair	Fair
Id Sandstone	Rock primarily	Good	Good
II Talus, Alluvial Cone & Fan			
IIo Talus	Easy	Good	Poor
IIa Alluvial Soils (related to Ia)	Medium to Easy	Fair to Good	Fair to Good
IIb Alluvial Soils (related to Ib)	Medium to Easy	Fair to Good	Fair to Good
IIc Alluvial Soils (related to Ic)	Medium to Easy	Fair to Good	Fair to Good
III Flood Plain			
IIIa Silts & well-drained Soils	Easy	Good	Good to Fair
IIIb Clays & poorly-drained Soils	Easy to Medium	Poor	Poor
IV Sand			
IVa Beach Sand	Easy	Good	Good
IVb Ridge Sand	Easy	Good	Good
IVc River Sand	Easy	Good	Good to Fair
V Tidal Area			
Va Low land	Easy to Medium	Fair to Poor	Poor
Vb Swamp	Medium to Difficult	Poor	Very Poor

Off-Shore Features

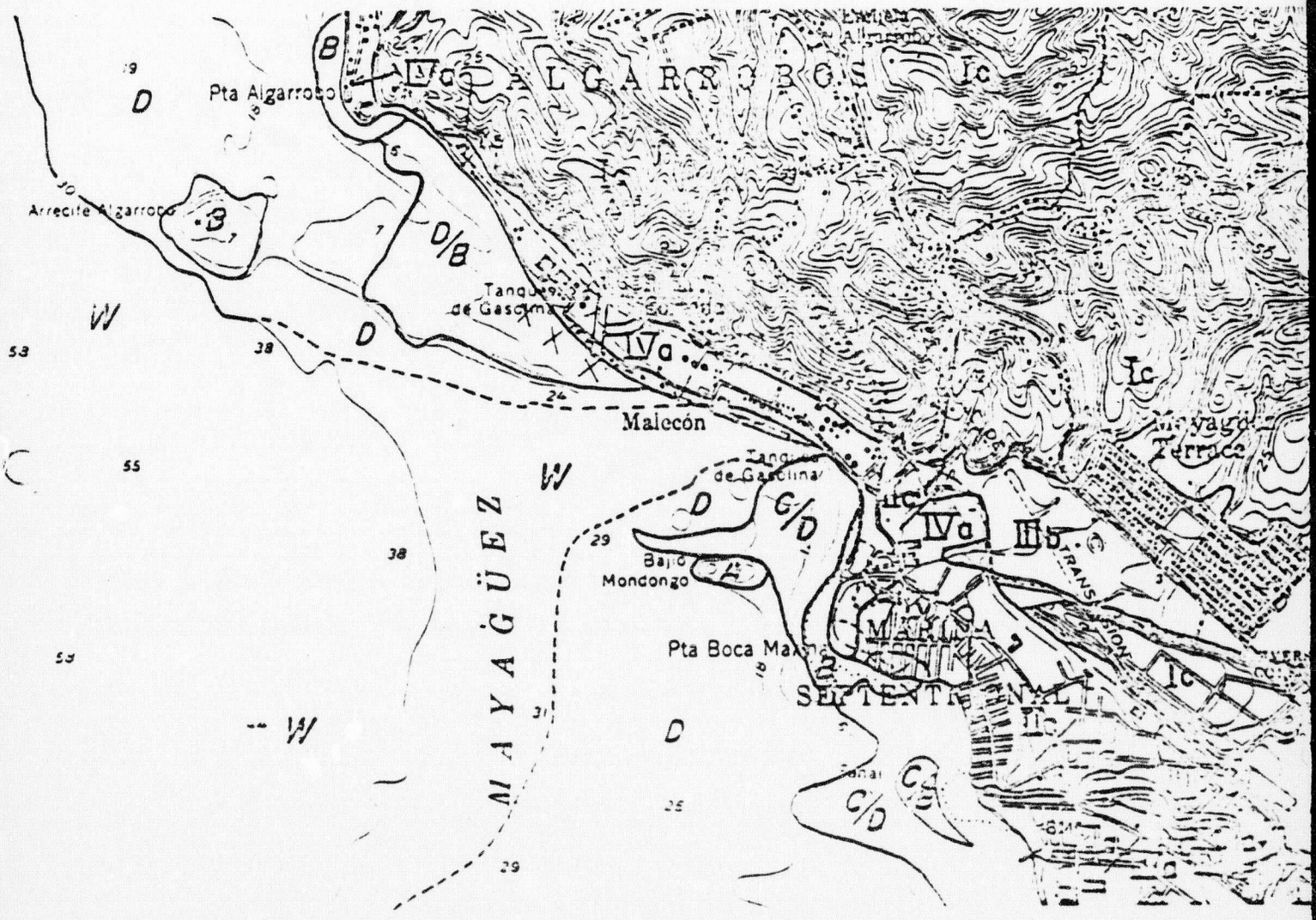
A Coral
B Coral or Rock
C Silts & clays primarily
D Sands primarily
W Water depth greater than thirty feet

Recommendations

P Potential Area for Port Development
x General Location for Limited Probing Program

*Note: 1. For a more detailed description see Part I of this report.
2. Compound symbols: A/B indicates A overlying B at relatively shallow depth.

E 422



PUERTO RICO PORTS AUTHORITY SAN JUAN P.R.

PORT SITES INVESTIGATION

S. MAYAGÜEZ

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SCALE 1:20000 DEC 1960 PLATE I of III

E 423

10. Anasco

Sources of Information: Topographic map, agricultural soil map, 1:15,000 scale airphotos, 1:20,000 scale hydrographic chart; field reconnaissance.

The on-shore area consists of hills of volcanic materials and sediments, partly metamorphosed, in the north, and flat areas of flood plains and beach sands in the south. The soil is generally well-drained and favorable for engineering development.

Off-shore, the harbor material is generally sandy with scattered rocks along the north coast; there is sand and some mud along the southern portion of the coast, with sand predominating. The approach to sea is convenient and dredging would be easy and not excessive.

In summary, the overall condition of this site is favorable, considering both on-shore and off-shore features. The land development along the north coast would be limited by topographic conditions, but there is ample space of favorable land at the southern section. Detailed information as well as potential development area and suggested probings are indicated in the accompanying map, Plate XI.

E 424

PLATE XI Añasoo

Condensed Legend*

On-Shore Features

Map Units	General Engineering Characteristics		
	Excavation	Drainage	Foundation
I Rock and Residual Soil			
Ia Granite	Variable	Good	Good
Ib Limestone	Variable	Good	Good to Fair
Ic Tuff, Shale	Variable	Fair	Fair
Id Sandstone	Rock primarily	Good	Good
II Talus, Alluvial Cone & Fan			
IIo Talus	Easy	Good	Poor
IIa Alluvial Soils (related to Ia)	Medium to Easy	Fair to Good	Fair to Good
IIb Alluvial Soils (related to Ib)	Medium to Easy	Fair to Good	Fair to Good
IIc Alluvial Soils (related to Ic)	Medium to Easy	Fair to Good	Fair to Good
III Flood Plain			
IIIa Silts and well-drained Soils	Easy	Good	Good to Fair
IIIa* IIIa over granular soils	Easy	Good	Good
IIIc Clays and poorly-drained Soils	Easy to Medium	Poor	Poor
IV Sand			
IVa Beach Sand	Easy	Good	Good
IVb Ridge Sand	Easy	Good	Good
IVc River Sand	Easy	Good	Good to Fair
V Tidal Area			
Va Low Land	Easy to Medium	Fair to Poor	Poor
Vb Swamp	Medium to Difficult	Poor	Very Poor

Off-Shore Features

A Coral
B Coral or Rock
C Silts and Clays primarily
D Sands primarily
W Water depth greater than thirty feet

Recommendations

P Potential Area for Port Development
x General Location for Limited Probing Program

*Note: 1. For a more detailed description see Part I of this report.
2. Compound symbols: A/B indicates A overlying B at relatively shallow depth.

E 426

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PORT SITES INVESTIGATION

10. AÑASCO

SCALE 1:20000 DEC 1960 PLATE XX of XXX

BASE MAP U.S.G.S. TOPOGRAPHIC SERIES

11. Arecibo

Sources of Information: Topographic map, agricultural soil map, geological map, 1:15,000 scale and 1:4,800 scale airphotos, 1:20,000 hydrographic chart; field investigation, and communications from Mr. A. Dauway, Puerto Rico Ports Authority.

The on-shore area consists of sedimentary rock hills, flood plains, beach sands and some swamps. There is also some land filled with dredged material. The on-shore soil condition is generally satisfactory for engineering purpose, although the areal extent of land is relatively limited.

Off-shore, the harbor bottom material is primarily sandy; rocks are found at shallow depths in scattered locations, particularly when close to the rock headland. A relatively small part of the harbor has been dredged to a depth of twenty-five feet. This small area is now protected by breakwater and is suitable for small crafts. The remaining major portion of the harbor, southwest of the dredged area, is composed of deep sand. The wave action there is exceedingly strong; some substantial protective structure would be required for the development of this area.

In summary, the overall condition of this area is not favorable because of the strong wave action affecting the major portion of the harbor. The already developed area is satisfactorily protected by the breakwater, but there, both on-shore and off-shore spaces are limited.

Detailed information is indicated in the accompanying map, Plate XII.

PLATE XII Arecibo

Condensed Legend
On-Shore Features

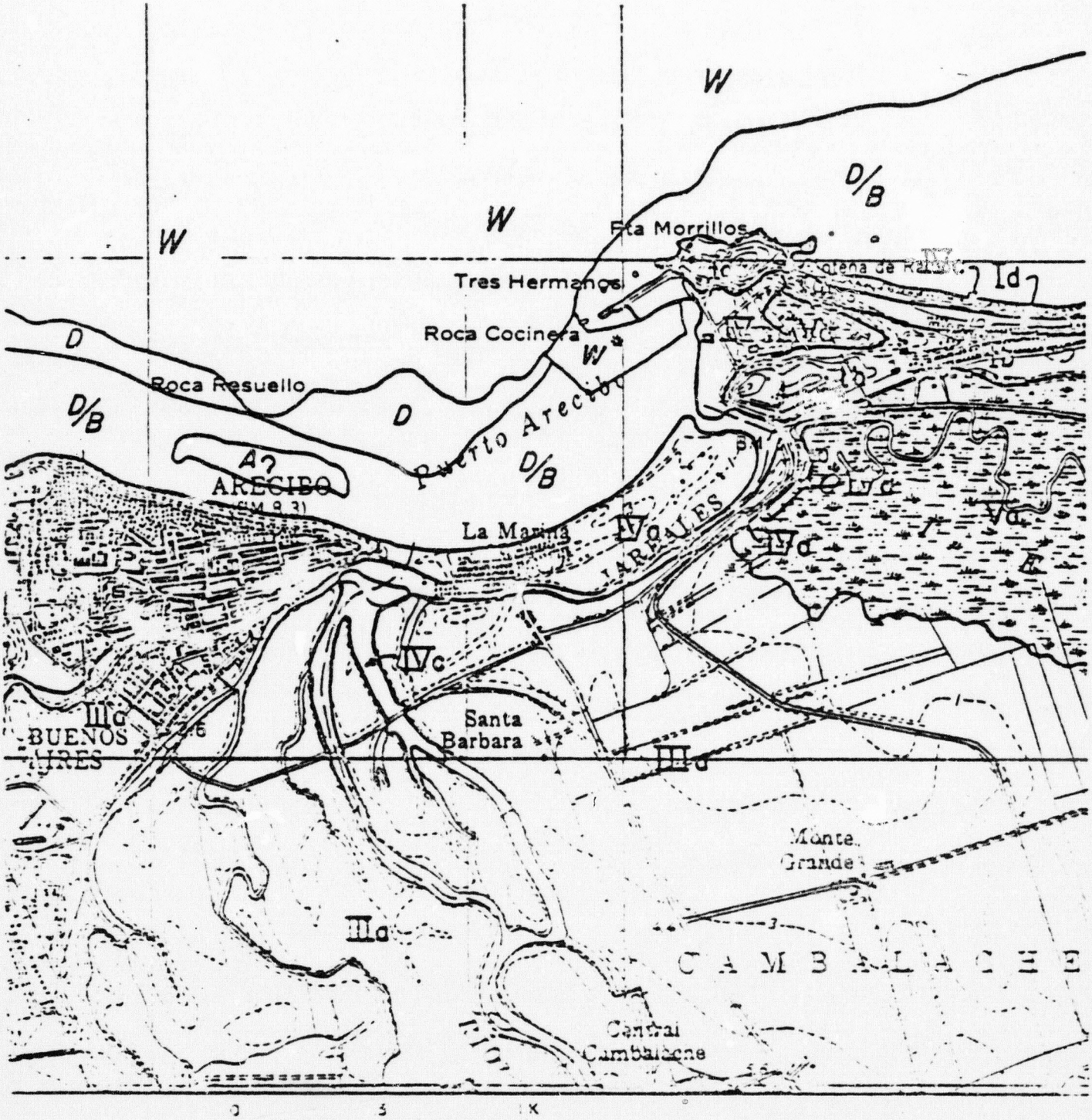
Map Units	General Engineering Characteristics		
	Excavation	Drainage	Foundation
I Rock and Residual Soil			
Ia Granite	Variable	Good	Good
Ib Limestone	Variable	Good	Good to Fair
Ic Tuff, Shale	Variable	Fair	Fair
Id Sandstone	Rock primarily	Good	Good
II Talus, Alluvial Cone & Fan			
IIo Talus	Easy	Good	Poor
IIa Alluvial Soils (related to Ia)	Medium to Easy	Fair to Good	Fair to Good
IIb Alluvial Soils (related to Ib)	Medium to Easy	Fair to Good	Fair to Good
IIc Alluvial Soils (related to Ic)	Medium to Easy	Fair to Good	Fair to Good
III Flood Plain			
IIIa Silts and well-drained Soils	Easy	Good	Good to Fair
IIIb Clays and poorly-drained Soils	Easy to Medium	Poor	Good to Fair
IV Sand			
IVa Beach Sand	Easy	Good	Good
IVb Ridge Sand	Easy	Good	Good
IVc River Sand	Easy	Good	Good to Fair
V Tidal Area			
Va Low land	Easy to Medium	Fair to Poor	Poor
Vb Swamp	Medium to Difficult	Poor	Very Poor

Off-Shore Features

A Coral
B Coral or Rock
C Silts and Clays primarily
D Sands Primarily
W Water depth greater than thirty feet

*note: 1. For a more detailed description see Part I of this report.
2. Compound symbols: A/B indicates A overlying B at relatively shallow depth.

W** Water depth twenty-five feet; dredged area



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SECTION VI - MARKETING OF CHEMICALS

The original plans for this petrochemical complex call for the manufacture of a number of chemicals. Studies by Phillips chemical marketing experts have estimated these chemicals in world markets about as follows:

Chemical	Quantity Produced	Estimated 1966 Free World Demand	Production % of Free World Demand
Cyclohexane	33 MM Gal/Yr	320 MM Gal/Yr	10.3
Benzene	30 " " "	1020 " " "	2.9
Ethyl Benzene	62 MM Lbs/Yr	*3900 MM Lbs/Yr	1.6
O-Xylene	68 MM Lbs/Yr	7700 MM Lbs/Yr	8.8
P-Xylene	49 MM Lbs/Yr	955 MM Lbs/Yr	5.1

*As styrene

These quantities are not considered excessive, particularly considering that Phillips is marketing three of these chemicals in world markets.

Plans have been laid for expansion of manufacturing facilities in steps beyond the original core plant. Probably succeeding steps are:

(1). Conversion of a portion of light naphtha to hydrogen and subsequently to ammonia and urea

(2) Conversion of ethyl benzene to styrene and subsequently polystyrene plastics

(3) Conversion of o-Xylene to phthalic anhydride and plasticizers (phthalic esters)

(4) Conversion of p-Xylene to terephthalic acid or dimethyl terephthalate (Dacron intermediate)

(5) Conversion of naphtha to ethylene and by-products which could produce polyethylene. polypropylene and synthetic rubber.

Markets on all of these products have been studied and deemed practical under predicted economics.

Phillips position in international marketing of chemicals places them in an ideal position to assist in marketing the chemicals produced from this complex. It is expected that this sales service would be the most economical means of vending these materials.

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It is proposed that initial operations in Puerto Rico would be handled by a new corporation organized to qualify for all investment incentives under Puerto Rican law. Capitalization of this company has been discussed in Section IV. Stock is expected to be offered to Puerto Rican investors. It is expected that some qualified Puerto Rican nationals will be officers of the company and members of the Board of Directors.

Future plants might be organized within this original corporation, but are not restricted to this organization. With a good source of basic chemical intermediates, it is expected that several satellite plants will be attracted to the area. These might be subsidiaries of other chemical companies or joint ventures possibly including some new Phillips capital. Expansion can also take place by vertical integration, converting intermediate chemicals completely to consumer products.

J-46, Telegram, Durand to Udall, January 14, 1964

USA 330 - 476
(ED. 4-23-71)
E 435
EXHIBIT
U. S. DIST. COURT
S. D. OF N. Y.
J-46
FPI-NI—8-24-75-80M-4417

In accordance with Section 2 (c) of Presidential Proclamation 3279 of March 10, 1959 as amended, and Section 14 (b) of Oil Import Regulation I, revision 4, the Economic Development Administration of Puerto Rico respectfully requests that the level of imports of unfinished oils into Puerto Rico be raised in the amount of 50,000 barrels per day. Detailed supporting letter will follow.

Note:

The above cable was sent from Mr. Durand's office to Secretary Udall this afternoon.

J-47, Petition to Oil Import Appeals Board, January 15, 1964

USA 338 - 475
(ED. 4-23-71)

E 436

EXHIBIT
U. S. DIST. COURT
S. D. OF N. Y.

J-97

FPI-MI—8-24-75-SOM-4417

United States
Department of the Interior
Oil Import Appeals Board

In the Matter of Phillips Petroleum Company Petitioner	Petition For Allocation of Unfinished Oil - Puerto Rico

DATE 470
FILM
BY

1. Petitioner

Phillips Petroleum Company, a Delaware corporation with home offices in Bartlesville, Oklahoma, is engaged internationally and domestically in the manufacture and sale of petrochemicals as well as in the production, refining, distillation and sale of petroleum products.

2. Grounds for Petition

The grounds for this Petition are special circumstances resulting from lack of basic raw materials necessary for the establishment of a chemical industry in Puerto Rico. Petitioner relies upon Sections 21(b)(2) and 21(c) of Oil Import Regulation 1 (Revision 7) and Sections 3(c)(2) and 13 of the Rules and Procedures of the Oil Import Appeals Board.

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3. Facts in Support Thereof

Petitioner proposes the construction of a chemical manufacturing facility in Puerto Rico, a project which will provide substantial benefits for Puerto Rico and which has the support of the Economic Development Administration of the Commonwealth of Puerto Rico. Economic feasibility of this proposed facility depends upon an allocation for the importation of unfinished oils as charge stock.

4. Relief Sought and Justification Therefor

Petitioner respectfully requests an allocation of 50,000 barrels per day of unfinished oils for the purpose of providing charge stock for the proposed facility in Puerto Rico. An allocation in such amount is necessary prior to the beginning of construction of the proposed facility and it is requested that such allocation become effective when construction of the proposed facility is sufficiently advanced to permit operation. Petitioner is advised that, pursuant to Section 2(c) of Proclamation 3279, as amended, and Section 11(b) of Oil Import Regulation 1 (Revision 4), the Economic Development Administration of the Commonwealth of Puerto Rico has contemporaneously with the filing of this Petition, requested that the maximum level of imports of crude and unfinished oils into that district be increased in the amount of 50,000 barrels per day.

5. Request for Hearing; Supplemental Filing

Petitioner requests an opportunity to be heard orally before the Board. Pursuant to Section 5 of the Rules and Procedures of the Board, Petitioner indicates its intention to submit further materials in support of this Petition prior to hearing.

Respectfully submitted,

CHAPMAN AND FRIEDMAN
938 Pennsylvania Building
Washington, D.C. 20004

Cesar L. Chapman

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Dated: January 15, 1964

J-48, Letter, Durand to Udall,

January 28, 1964

J-48

E 439

January 28, 1954

The Honorable Stewart L. Udall
Secretary
Department of the Interior
Washington, D. C.

Dear Mr. Secretary:

In accordance with my telegram of January 14, 1954, the following summary is presented in support of the request contained therein for an increase in the level of imports of unfinished oils into Puerto Rico in the amount of 50,000 barrels per day, pursuant to Section 2 (c) of Presidential Proclamation 3279 of March 10, 1959, as amended, and Section 14 (b) of Oil Import Regulation I, revision 4. There exists a critical demand in Puerto Rico which necessitated the requested increase, as set forth below.

For several years, this agency has worked with you, your organization, several other Departments and Agencies of the United States Government, and the U.S. business community to improve basic economic conditions in Puerto Rico. Our mutual success in this endeavor has earned for us national and international recognition. We extend our sincere appreciation to you and your Department for its continued support and assistance.

Since 1950, the Economic Development Administration has been analyzing its past and present performance in an attempt to plan more effectively for the future. In the course of these analyses, we have made extensive use of the facilities and prior research of your Department concerning the natural resources of Puerto Rico. In addition, supplementing the perhaps subjective research of our own organization, we have employed recognized objective consulting engineering firms to assist us in planning the future of Puerto Rico's development. A brief review of our findings and conclusions may be helpful to you and your staff; the results of our work and your present determinations with respect to our conclusions will have great significance in our future program.

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PLTF EXBT 190 for Plntf
J. HORN
SEP 21 1972

The primary objective of the Economic Development Administration is to develop long-term job opportunities for our people, using economic and governmental stimuli similar to those employed in the Mainland and foreign nations. It has been well recognized that the economic progress of Puerto Rico depends in part on forces beyond our control but within the power of the United States, thus it becomes our duty to point out the special requirements necessary for growth. The Fomento group does not wish to penalize existing United States or Puerto Rican industry; Fomento does wish, however, to provide Puerto Rico with a sound basic plan to share in world markets.

Analysis of Puerto Rico's economic position today shows how progress has been made. It also provides insight concerning future needs. Results to date have been achieved primarily by:

1. Tax and other governmental incentives, including educational and vocational training.

2. Labor cost and productivity advantages.

3. Resort and tourist attractions caused by location and history.

4. Ability and initiative of our people.

Strategic use of these advantages, singly or in combination, has made Puerto Rico one of the world's fastest growing economies. The Island's economy, once dependent upon a single agricultural commodity, sugar, is now based upon a highly diversified group of industrial, agricultural and service companies. The dramatic results, so well known to the world, have been achieved in the face of chronic difficulties in natural resources.

Statistical data and interpretive volumes based thereon have been made available to the Department showing Puerto Rico's achievements. When recent reports are critically reviewed, however, there is justifiable cause for concern and demonstrable reason for new courses of action. To plan now for 1970, or even for 1966, Puerto Rico must consider:

1. Tax incentives, tariff and transportation privileges existing at the end of World War II do not mean much in the world of 1964. This world has been taught, largely by the United States, the arts of communal trade and monetary manipulation; financially, again with the help of the United States, many nations are able to provide similar or offsetting advantages as inducements to private enterprise.

2. In view of the startling advances of administrative and mechanical automation, educational and vocational training must be drastically changed to reflect the needs of any future development program.

3. Labor cost and productivity advantages are diminishing rapidly; our average wages have increased more than 25% since 1958, and now are the highest in the world with the exception of U.S., Canada, and Sweden.

4. The resort and tourist business is seasonal, does not provide long-term potential for growth; employment averages less than two persons per room available; bad weather, or new developments in air transportation could destroy the industry.

In addition to the deterioration of post-war advantages of Puerto Rico, other observations are being taken into account in future planning:

1. The percent of the labor force, now almost 700,000, which is unemployed, is beginning to rise; it is more than double the United States average; it would be astronomical if more than 500,000 Puerto Ricans had not migrated to the continental United States during the 1950's.

2. Employment generated by Operation Bootstrap has been offset by substantial declines in agricultural jobs and specialized skills such as needlework.

3. There is no foreseeable reason to believe that technological advances will not cause

further unemployment in Puerto Rico, at a faster rate than in the United States because a larger percentage of employment is engaged in clerical and semi-skilled jobs, although in many cases the people have been trained for and are capable of better work.

4. There is substantial evidence that a plateau in accomplishment has been achieved, and that a new approach to creating job opportunities must be added to the present program:

   a. Average employment per plant induced to locate in Puerto Rico is declining.

   b. Average investment per job created is increasing, to 1958, it was $10,800, since 1958, it has been $13,300.

c. Created jobs generally have not generated sufficient additional jobs because they tend to be concentrated in "finishing" operations rather than primary processing.

d. All of the States spent $39 million for planning and business development purposes in 1960; Puerto Rico spent $7.8 million, or 20% of the all-States total. Despite this massive effort, and after more than 15 years of intensive promotion, an impressive record of success stories, and an unequalled combination of inducements, a recent major survey reported that only 1% of corporate executives would even consider Puerto Rico for plant location purposes.

5. Created jobs have tended to cluster in selected areas where tax and labor factors are highly significant. These include apparel, fish processing, electronics and sporting goods manufacture.

6. Created jobs have employed more women than men, producing severe social problems. Two thirds of Manufacturing employment is female.

In summary, as members of the American community, we are required to help raise wage scales to levels as high as those in the continental United States as soon as possible under the Fair Labor Standards Act. Per capita income in Puerto Rico in 1962 was 52% of that in Mississippi, 20% of that in the continental United States. As early as 1956, nations destroyed by war, such as France, Denmark, the Netherlands, West Germany, Belgium, had already achieved per capita income levels far in excess of our own results four years later.

As others outside of Puerto Rico have said, a remarkable growth has been accomplished. But we have known too, for several years, that our rate of progress could not depend indefinitely on present criteria. As stated earlier, we have been re-evaluating our position for several years. Internally, and with the help of many recognized external experts, we have examined our resources to find new answers to predictable problems. It is not our intention to present such problems without presenting their practical solutions.

With our objective still the economic improvement of the individual, we have re-examined our resources in the world of 1964, a far different world than that of 1956. Our resources are:

1. The people of Puerto Rico.

2. The land of Puerto Rico and the sea that surrounds it.

3. Incentives to private industry based not only on climate and economics, but including research, advanced technical training, raw material supplies, and development of local and world markets.

The resource represented by the people of Puerto Rico has proved itself capable of great adaptability to new jobs; in many instances, productivity per man hour exceeds continental productivity.

The resources represented by the land and sea are being exploited by use of the most advanced agricultural programs developed in the United States and elsewhere. Educational, technical, and field research projects are extensive and are being expanded. Consideration is being given to additional research facilities, including computer compilation and simulation.

Marine research is being carried on by private industry, universities and government, and in cooperation with the Department of the Interior. Except in the area of production of fresh water from sea water, it is conceded by most experts that huge sums of money and several years of work will be required before the ocean becomes a source of low cost raw materials other than food.

With respect to capital and incentives, the Commonwealth of Puerto Rico has shown versatility and imagination, without dissipating funds. One of the major contributions that can be made to industry, locating in Puerto Rico in the future is the knowledge and experience gained by the Economic Development Administration. This experience, secured principally in order to influence selection of Puerto Rico for plant location, can now be used to help develop sources of supply and markets for products.

Within the Island, the Department of the Interior, the Commonwealth and private industry, and industrial consultants are in agreement that natural chemical and mineral resources are for any practical purposes, non-existent. We conclude, therefore, that this deficiency must, if possible, be corrected. The Island's salt, its sands, its limestone, its agricultural by-products will not, within the next decade, provide the raw materials necessary to bring basic industries to Puerto Rico. One need only look at the historic and relative development of the United States to realize that Puerto Rico must have raw materials in order to grow, and to provide a greater measure of economic self-sufficiency.

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In the 65 years since Puerto Rico has been a part of the United States, the continental States have developed from an agricultural economy to a well-balanced integrated industrial power. The Department of the Interior has been particularly helpful to the total economy in its partial management of natural resources. Every State has benefited directly or indirectly from the development of continental mineral production. Even Mississippi, with the lowest continental per capita income, produced mineral raw materials valued at $199 million in 1950.

With the assistance of your Department and others, we have explored world sources of raw materials. We have concluded that the most versatile economical and practical source of chemicals and minerals is petroleum. In terms of chemical progress, petroleum in recent years has shown such potential that its derivatives have replaced other natural chemicals. Laboratory experts do not yet foresee the limits of its capabilities. Of what importance to Puerto Rico is that, although tremendous investment is required to initiate the production of chemicals from petroleum, and the initial chemicals require few workers, the progressive processing of these materials will employ thousands of persons directly. In addition, indirect employment and employment in support industries can be equally impressive.

With respect to employment potential, one of the recognized industrial chemical corporations has estimated that a chemical core industry might cost initially, less than $50 million. It would require 400 to 800 operating and administrative personnel. With adequate market development and integration, the further processing of the chemicals through to consumer products would require additional investment of $300 million to $450 million, with employment reaching 9,000 to 14,000 people. An additional continuously employed construction group of 500 to 600 would be necessary. The actual number of jobs created would depend in part on what products are sold, to whom they are sold, and the final consumer products produced.

In order to compensate in part for the disadvantages of starting late in a highly competitive and rapidly expanding industry, it is our intention to give our full support to the company or group of companies which might develop an integrated chemical complex in Puerto Rico. In giving this support, we do not intend to impair competition, neither do we intend to protect markets. Several petroleum companies have been made aware of our position.

It may be argued that an extensive petroleum industry exists in Puerto Rico. This is true. This industry has not, however, developed the chemical feed-stocks which we require. In many cases, it is not economically feasible to produce a single chemical from petroleum.

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Because of this, we have been unable to induce, in recent years, large users of single chemicals to locate in Puerto Rico. In addition, we have not been able to bring together a group of companies which could simultaneously benefit themselves and Puerto Rico by jointly supporting a multi-chemical plant.

For more than five years, we have entertained proposals from many companies directly in the petroleum business or which may use petroleum derived chemicals. We have, until now, withheld our support for these projects. In general, they were conceived on the economic basis of the differentials between the costs of domestic and foreign crude petroleum, while providing a limited range of chemicals. Each of these proposals would have, in effect, provided competition for Puerto Rico's pioneer refineries, and would have required the marketing of substantial amount of refinery yields as gasoline and other fuels.

We recognize that oil import quotas are necessary to provide part of the economic incentives in a major chemical complex. We recognize also that we cannot delay indefinitely our entry into the chemical raw materials industry. Within recent weeks, after several years of planning and research, the Phillips Petroleum Company has presented a project which, in our best judgment, provides the maximum potential to Puerto Rico, and makes it possible for us to take full advantage of our other resources.

The Phillips project provides for:

1. The establishment of a chemical core complex to be charged with 50,000 barrels per day of unfinished oils. This amount of unfinished oils is the average yield from 150,000 barrels per day of crude petroleum to be refined elsewhere.

2. An initial investment of $45 million, to be expanded to $100,000 million by Phillips. In addition, there will be investments by satellite companies already using materials in which Phillips has a major competitive position, or processes which Phillips controls.

3. Major opportunities for Puerto Rican companies and individuals to participate in construction and management.

4. Fulfilling one of our other needs: To secure private Puerto Rican investment in fields other than real estate or service businesses. Phillips will encourage Puerto Rican capital investment and the petrochemical industry will provide, in our opinion, the basis for the development of an eventual Puerto Rican stock market and exchange.

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5. The use of more than 50% of the charge stock to produce chemicals, to remove aromatic fractions and to operate the facilities. Less than 50% of the processed material will become motor fuels.

Phillips is recognized for its research leadership. It is already in business with most of the large chemical processing firms. The company has also demonstrated that, as a matter of operating policy, it will provide engineering, research, and financial support to new product ideas from raw material concept through to marketable consumer products.

In order, therefore, to meet the critical needs of Puerto Rico for raw materials which will provide major opportunities for new investment and new employment, we have requested that the level of imports of unfinished oils to the Island be increased in the amount of 50,000 barrels per day. We understand that a formal petition has been presented to the Oil Import Appeals Board concerning the Phillips project. We would appreciate the opportunity to confer with you concerning its merits.

We are certain that with your assistance a project of this type which will provide a basis for the continuous economic growth of the Commonwealth of Puerto Rico and which will promote the national security of the United States can be successfully undertaken.

Sincerely yours,

Rafael Durand
Administrator

J-49, Brief to Oil Import Appeals Board, May 1964

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(ED. 4-23-71)

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EXHIBIT
U. S. DIST. COURT
S. D. OF N. Y.

J-99

FPI-121—8-24-75-500-4417

United States
Department of the Interior
Oil Import Appeals Board

In the Matter)
of)
Phillips Petroleum Company)
Petitioner) Docket No. K-12

Brief In Support of Petition
For Allocation of Unfinished Oils - Puerto Rico

Introduction

This brief and attachment are submitted pursuant to section 5 of the Board's Rules and Procedures as further material in support of the Petition of Phillips Petroleum Company (Petitioner), filed with the Oil Import Appeals Board on January 15, 1964, requesting an allocation of unfinished oils for import into Puerto Rico.

On January 14, 1964, the Administrator of the Economic Development Administration of the Commonwealth of Puerto Rico (EDA) by telegram requested that, pursuant to section 2(c) of Proclamation 3279, as amended, the Secretary of the Interior increase the level of imports of unfinished oils into Puerto Rico in the amount of 50,000 barrels per day. On January 28, 1964, the EDA Administrator in an eight-page letter in detailed support of his

telegraphic request indicated that the increase sought would provide the feedstock necessary for Petitioner to establish a core chemical facility in Puerto Rico. The Administrator strongly emphasized the critical need in Puerto Rico for such a facility which would produce the raw materials necessary to provide major opportunities for new investment and new employment, noting that natural chemical and mineral resources are practically non-existent on Puerto Rico, that raw materials must be provided to attract basic industry, and that the existing refineries have not developed the necessary raw material chemicals.

For over five years EDA has entertained proposals to establish a petrochemical facility in Puerto Rico. According to the Administrator, support for such proposals was withheld because of the limited range of chemicals and the large refinery yields of distillates, heavy fuel oil and gasoline which would have been marketed under the several proposals. In contrast, the proposed petrochemical facility of Phillips Petroleum Company is strongly supported by EDA since it meets the needs of Puerto Rico and would not injure the refineries of the Island.

I.

Petitioner's Proposed Facility for Meeting the Needs of Puerto Rico

Petitioner proposes to establish a core chemical manufacturing plant

using 50,000 barrels per day of selected hydrocarbon fractions.[1] Petitioner determined that, from the point of view of the needs of Puerto Rico as seen in the objectives of EDA, crude oil would not be satisfactory as feedstock since refined by-product yields such as distillates, heavy fuel oil and gasoline would be excessive. As a result of further study it was determined that the use of select hydrocarbon fractions would provide maximum yields of petrochemicals while yields of motor fuel would be less than 50 percent of feedstock volume. Petitioner possesses sufficient foreign reserves of crude oil and access to offshore facilities required to yield the requisite hydrocarbon fractions.

Utilizing 50,000 barrels per day of feedstock, expected product volumes are as follows:

Cyclohexane	33,000,000 gal/yr.
Benzene	30,000,000 gal/yr.
Ethyl benzene	62,000,000 lbs/yr.
Ortho xylene	68,000,000 lbs/yr.
Para xylene	49,000,000 lbs/yr.
Paraffinic fraction	8,000 b/d[2]
Motor fuel	24,800 b/d

Establishment of the core industry would provide substantial economic benefit to Puerto Rico, giving rise to the development of satellite plants around the core industry to utilize these intermediate chemicals in the pro-

1. A copy of the Proposal Regarding A Core Chemical Industry for Puerto Rico submitted to the Administrator, Economic Development Administration by Petitioner (Appendix) is attached and made a part hereof.
2. Any portion of the yield of paraffinic fractions not utilized for manufacture in Puerto Rico will be exported to markets outside the continental United States.

duction of consumer goods. Benefits will be especially of value since it is planned to locate the core industry in a critically depressed economic area.

The proposed core chemical manufacturing plant will require an initial capital investment by Petitioner in petrochemical facilities of $45,000,000. An additional $17,000,000 in working capital will also be required. As stated in Petitioner's proposal (attached hereto), present market forecasts indicate that within five or six years after the facility is in operation a demand for petrochemicals is indicated which would support an expansion of facilities to a gross investment of over $100,000,000. It is estimated that full development of the core industry and its satellites would require capital investment in Puerto Rico in the order of $300,000,000 to $500,000,000.

Petitioner's proposal indicates an expected employment of approximately 800-900 persons during the 15-month period needed for construction of the chemical manufacturing plant. Upon completion, it is estimated that the plant will furnish employment to approximately 400 persons by way of direct employment and community support employment. Full development of the core industry and satellite companies would require an estimated manpower of over 9,000 persons in direct employment and community support.

As stated in Petitioner's proposal to EDA, the core chemical facility

would operate in Puerto Rico as a corporate subsidiary organization in which Puerto Rican investment will be invited. Representation on the Board of Directors of such organization by Puerto Ricans is also contemplated.

Petitioner is prepared to undertake construction of the proposed project immediately upon receiving an allocation to import the requisite hydrocarbon fractions. Because of the sizeable investment of risk capital involved, the grant of an allocation is necessary so that Petitioner may utilize its foreign supply of low-cost feedstock and be able to render the project economically feasible through marketing a portion of the yield as motor fuel.

II.

A. Grounds for Petition

Petitioner is not eligible for an allocation of unfinished oils for import into Puerto Rico under the provisions of section 4(b) of the Oil Import Regulation and requests that the Board grant an allocation of unfinished oils pursuant to section 21(b)(2) of the Regulation.

Section 21(b)(2) authorizes the Board to "grant allocations of crude oil and unfinished oils in special circumstances to persons with importing histories who do not qualify for the allocations under this regulation." Petitioner submits that the instant petition clearly presents special

circumstances in the form of substantial economic benefits which will accrue to Puerto Rico from the proposed core chemical facility. In addition, Petitioner is a person with an importing history, having been classified as a "new importer" under the voluntary program and having subsequently held an allocation to import crude and unfinished oils into Districts I-IV. It is clear, therefore, that the Board is legally authorized by Proclamation 3279 and the regulation thereunder to grant the allocation requested here.[3] The sole question before the Board is one of policy, viz., whether the Board should determine that a history of imports into Puerto Rico itself is necessary in order for an allocation to be granted.

Petitioner submits that the public interest as well as executive intent back of the mandatory program requires that an allocation be granted in the present circumstances. Under the voluntary program, it is recalled, Puerto Rico was not included among the geographic areas where import restrictions were in effect. It later became apparent that Puerto Rico provided a "loop-hole" by which oil could be imported, converted into finished products and moved to the continental United States

3. The Report of March 6, 1959, of the Special Committee to Investigate Crude Oil Imports which recommended the imposition of mandatory controls also recommended the establishment of an appeals board which would be empowered to grant or modify allocations "on grounds of hardship, error, or other relevant special consideration." This recommendation which formed the basis for the present authority of the Oil Import Appeals Board clearly envisaged the appeals board as an instrument to provide some measure of flexibility to the controls so as to remedy hardship cases, erroneous determinations by the Administrator and situations calling for special consideration as the present petition.

without restriction. Accordingly, Proclamation 3279 placed Puerto Rico within the area of control. Concerning this action, the Secretary of Interior stated:

> It is my understanding that such restrictions were not placed on Puerto Rico with the view of hindering or in any way encumbering its own economic growth, but rather to place a reasonable limitation on the movement of petroleum from Puerto Rico to the Continental United States so that the "loop-hole" would, if not blocked entirely, at least be reduced in its impact.[4]

Additionally, it also appears that early in the life of the mandatory program it was officially proposed that the limitation on movements from Puerto Rico be accomplished by means of quotas placed thereon, leaving Puerto Rico free to import what it desired to meet growing local demand and whatever export demand might be established. The present scheme was retained, however, and while limiting imports into Puerto Rico, the mandatory program was primarily designed to limit the movement of petroleum from Puerto Rico into the continental United States. In passing upon the instant petition, therefore, the Board should consider the following:

1. In exercising its authority under section 21 of the Oil Import Regulation the Board is limited only by provisions contained therein, by provisions of other sections incorporated by section 21, and by such rules and procedures as the Board has established under section 21(d). In exer-

4. Letter of Secretary Seaton to Governor Munoz-Marin, September 2, 1959, Public Hearing File, San Juan, Puerto Rico, July 8-9, Office of Oil Import Administration.

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cising its authority the Board is not otherwise limited by the Oil Import Regulation nor is it otherwise bound by determinations of the Administrator. There is no provision in section 21 or in the rules and procedures of the Board which indicates that the Board is bound by its own past decisions and it is thus clear that the principle of stare decisis is not applicable.[5]

2. The purpose of bringing Puerto Rico under the mandatory program was to prevent the controls from being undermined by unlimited movements into the continental United States. There was no intent to encumber the industrial growth of Puerto Rico, and as seen above, such intent was expressly disavowed.

3. At the inception of controls Puerto Rico was clearly an underdeveloped area and consequently only a handful of refiners had refinery capacity in 1958. Today Puerto Rico is striving to promote its industrial development but if the Board should take the policy position that it will grant allocations under section 21(b)(2) only to persons having

5. See Kentucky Broadcasting Corp. v. Federal Comm. Comm'n. 174 F. 2d 38 (D.C. Cir. 1949); State Airlines, Inc. v. Federal Aeronautics Bd., 174 F. 2d 510 (D.C. Cir. 1949), to the effect that the doctrine of stare decisis is not generally applicable to decisions of administrative tribunals. Compare Petition of Crown Central Petroleum Corporation (C-20), where the Board decided that it would not consider events transpiring prior to the inception of the mandatory program in exercising its authority to correct errors, with Petition of Crown Central Petroleum Corporation (E-6) where the Board exercised its authority to grant relief based on such events.

a history of imports into Puerto Rico it would follow that the Board's authority is now a dead letter so far as Puerto Rico is concerned.[6]

4. Should the Board take the position just mentioned it would also follow that those eligible under section 4(b) of the Oil Import Regulation would have a built-in monopoly bestowed upon them, in clear contravention of the policy of the antitrust laws. Additionally, the same handful of eligibles would be in a position to determine in large measure the course of industrial development in Puerto Rico. Such results were obviously not intended by the framers of the program and should not be permitted to occur.

Your Petitioner respectfully submits that if the mandatory program is not to be administered in such a way as to hinder industrial development in Puerto Rico the Board should grant the allocation re-

6. The only decision of the Board, so far as Petitioner is aware, which touches upon the question presented here is the decision on the Appeal and Petition of Tropical Gas Company, Inc., (B-1), November 25, 1959. In Tropical petitioner held an allocation to import finished products into Puerto Rico and sought an allocation to import finished products into Districts I-IV. The Administrator refused to consider petitioner as being eligible for an allocation, indicating that a history of importation into one area during the base period does not qualify an applicant for an allocation in either of the other two areas. On appeal, petitioner asserted that the Board has authority to grant allocations of finished products just as it may grant allocations of crude oil and unfinished oil in special circumstances to persons with importing histories who do not qualify for allocations. The Board disposed of this contention by pointing out that it was not authorized to grant allocations of finished products. The Tropical decision, therefore, did not deal with the authority of the Board to grant allocations for import into Puerto Rico under section 21(b)(2).

quested in the present petition.

B. Allocation Requested

Petitioner is advised that on January 14, 1964, the Administrator of the Economic Development Administration requested that the level of imports of unfinished oils into Puerto Rico be increased by the Secretary in the amount of 50,000 barrels per day for the purpose of providing feedstock for the core chemical industry proposed by Petitioner. Petitioner requests that it be granted an allocation to import unfinished oils into Puerto Rico in an amount of 50,000 barrels per day, such allocation to be conditioned upon an increase in the maximum level of imports by the Secretary of the Interior for this purpose and to become effective when plant construction is sufficiently advanced to warrant operation.

Respectfully submitted,

Oscar L. Chapman

CHAPMAN, FRIEDMAN, SHEA, CLUBB AND DUFF
932 Pennsylvania Building
Washington, D.C. 20004

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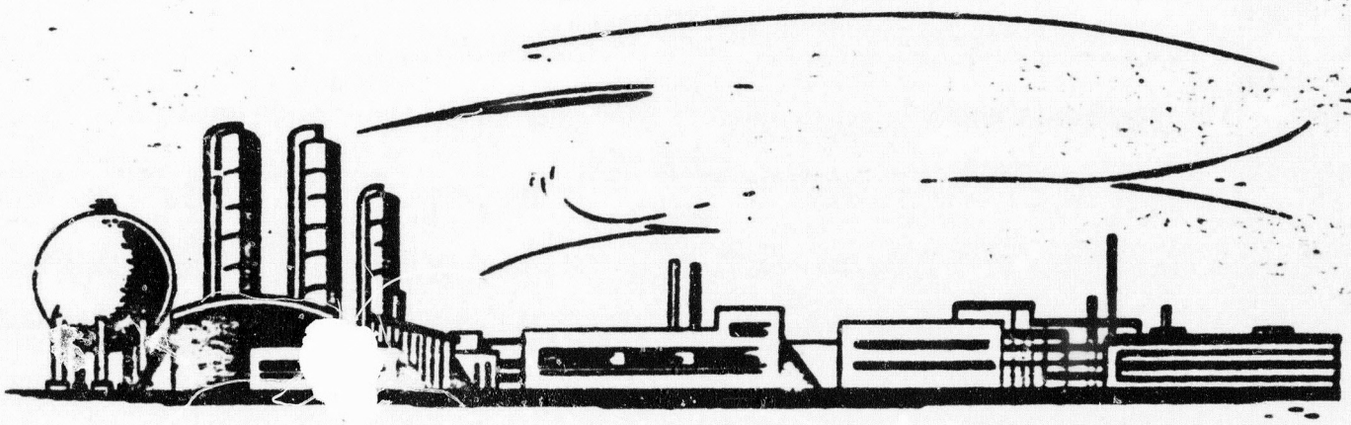

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PROPOSAL

TO: **Mr. Rafael Durand**

ADMINISTRATOR
ECONOMIC DEVELOPMENT ADMINISTRATION

FROM: **Stanley Learned**

PRESIDENT
PHILLIPS PETROLEUM COMPANY

REGARDING: A CORE CHEMICAL INDUSTRY
FOR PUERTO RICO

J-50, Brochure submitted to Oil Import Appeals Board
May, 1964

E 459

PHILLIPS PETROLEUM COMPANY

BARTLESVILLE, OKLAHOMA

December 16, 1963

STANLEY LEARNED
PRESIDENT

Mr. Rafael Durand, Administrator
Economic Development Administration
Commonwealth of Puerto Rico
San Juan, Puerto Rico

Chemical Manufacturing Facilities
in Puerto Rico

Dear Mr. Durand:

We have been analyzing Puerto Rico's potential in the manufacture of chemical products for world marketing with several members of your organization and our own International Department and Executive Department officials. We now propose a project which can provide benefits to Puerto Rico, the Continental United States, and Phillips Petroleum Company.

The basis of the proposed operation is through a unique combination of resources to provide maximum petrochemical yields in Puerto Rico and yields of by-product motor fuels not to exceed 50 per cent of the feed stock used. In addition it is planned to encourage maximum participation in the project by Puerto Rico capital.

The most important consideration developed from our studies is that a core chemical manufacturing plant charging 50,000 barrels per day of carefully selected hydrocarbon fractions offers a potential for an eventual sound investment of $300,000,000 to $500,000,000 in a series of plants necessary to convert the raw materials to consumer goods. Such an investment will give employment to many thousands of people in direct and affiliated operations. In addition, large numbers of people will have to be employed in development of community housing and support services.

The potential for development of new products, services and employment with the establishment of this basic industry is limited only by our joint efforts to develop markets. Our confidence in the future of this industry in Puerto Rico is such that

we are willing and able to make an initial investment of $45,000,000 in basic petrochemical facilities. In addition we will place all of the technical and marketing capabilities of Phillips Petroleum Company in support of efforts to develop additional investment by ourselves and our customers. After this initial stage the project itself should offer so many benefits to Puerto Rico and its customers that it will generate on its own the funds required for continuing development.

Our decision to make this major initial commitment in Puerto Rico is based largely on our confidence in the continued support of Puerto Rico's manpower, financial and material resources. Certainly the major incentives offered through the Economic Development Administration for encouragement of new industries have had a major bearing on our decision to make such investment.

We recognize that substantial quantities of chemical materials will be produced which cannot currently be consumed within Puerto Rico. Accordingly, we are prepared to apply the efforts of our worldwide marketing organization toward the successful sale of these chemical products.

Summarizing the results of our work, Phillips can provide the following unique combination of advantages for this project:

1 - Supply of select hydrocarbon fractions, all of which are suitable for chemical manufacture, rather than a supply of crude oil as feedstock.

2 - Use of Phillips' proven technical knowledge and experience in petrochemical manufacture.

3 - Use of Phillips' worldwide petrochemical marketing organization to help to establish markets for all products in excess of the internal requirements of Puerto Rico.

Immediately after a quota for Phillips Petroleum Company to import 50,000 barrels per day of select hydrocarbon fractions to Puerto Rico can be obtained, we are ready to implement this project.

As indicated, our initial investment in petrochemical facilities will be $45,000,000. Our present market forecasts indicate that within 5 or 6 years after the operation is on stream there will be a demand for products to support an expansion of the facilities to a gross investment in excess of $100,000,000.

We are attaching an economic analysis and a schedule of operating results for the proposed complex. In addition, a summary of products to be produced and a partial listing of possible satellite companies which will be interested in a new source of materials in the Caribbean is provided. Supporting these addenda are extensive confidential Phillips' surveys and reports concerning economic, operating, financial, engineering, organization and research considerations. These are available to you as required.

This project will provide substantial benefits and a means for Puerto Rico to participate prominently in world chemical markets. We are prepared to meet with you in Puerto Rico at your convenience if it will help to expedite this project.

Yours very truly,

[redacted]

Stanley Learned

SSL:mg
Attachments

INDEX OF ATTACHMENTS

Section I	Concept of a Core Chemical Industry
Section II	Choice of Feedstock
Section III	Choice of Products
Section IV	Step-wise Development
Section V	Financial Feasibility
Section VI	Capability of Phillips Petroleum Company

SECTION 1

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Concept of a Core Chemical Industry

Consultation between representatives of the Economic Development Administration and Phillips Petroleum Company indicate that many years of careful study have been devoted by the EDA to Puerto Rico's need for a chemical core industry. Factors recognized by EDA with respect to such an industry include the following:

1. A compelling reason for establishment of the industry is to eventually provide gainful employment for large numbers of people. This objective can only be reached through development of satellite plants, around the core industry, which use intermediate chemicals to create consumer goods.
2. The several satellite plants can only be developed if an economically attractive situation exists for each. This requires that each intermediate produced must be in sufficient volume to supply a subsequent plant which can compete in the world market. Therefore, the core industry must be established on a very large scale, requiring correspondingly large volume of feedstock.
3. This bold concept for the core industry and rapid addition of satellite industries will require massive investments of risk capital. A primary consideration in securing such capital will be the assured availability of a long-term supply of low cost feedstocks.

4. The feedstock and processing steps should be selected to minimize the production of refined by-products such as motor fuel. (A reasonable objective is that refined by-products should be less than one-half of the feedstock volume.)

5. Because of its impact on the economy of Puerto Rico, every possible precaution must be taken to assure the success of this plan before it is initiated. Therefore, the company which sponsors the establishment of the core chemical facility must have demonstrated outstanding capability in such varied fields as research, engineering, manufacturing, finance and marketing. In addition it should have successful experience with the specific challenges of developing petrochemical projects from the laboratory through plant operation to consumer acceptance.

6. Finally the sponsoring company should evidence its acceptance of a long range growth commitment in Puerto Rico rather than one of short term realization of profits via dividends. The plan conceived must initially be established on a sound basis with the expectation that cash generated in the early years of operation will be used to expand the facility.

Section II: Choice of Feedstock

Phillips Petroleum Company, while searching for means to establish a core chemical industry in Puerto Rico consistent with

the objectives of the Economic Development Administration, soon realized that full range crude oil would not be satistactory as foodstock. Refined by-product yields from crude oil would be excessive. Further study revealed that through use of selected hydrocarbon fractions as feedstock, the objectives could be reached. Such hydrocarbon fractions, containing high percentages of the lower boiling naphthenes, may be derived from crude oil and from natural gas liquids which are available to Phillips Petroleum Company through world-wide operations of the Company.

Economics and marketing studies made concerning the supply of selected hydrocarbon fractions as feedstock disclosed the following:

1. Three to four volumes of crude oil are required to yield one volume of suitable feedstock.
2. Processing of 50,000 B/D of selected hydrocarbon fractions in Puerto Rico represents the minimum volume which will satisfy the objectives of the Economic Development Administration.
3. Sufficient supplies of suitable crude oil and natural gas liquids are available to Phillips Petroleum Company to furnish the quantity (in excess of 150,000 barrels per day) which will be required to yield 50,000 barrels per day of selected hydrocarbon fractions.
4. The volume of oil remaining after removal of the selected hydrocarbon fractions, can be economically refined and marketed by Phillips Petroleum Company in areas outside the Continental United States and Puerto Rico.

Section III: Choice of Products

One factor recognized by the Economic Development Administration is the need for large volumes of hydrocarbons as feedstock for the chemical core plant. This concept demands that three types of processing be considered for incorporation in the chemical core industry. The three types of processing all practiced by Phillips Petroleum Company and all employing hydrocarbons as feedstocks, are:

1. Production of aromatics and cyclohexane.
2. Production of fertilizers.
3. Production of olefins.

Engineering and Marketing studies indicate that primary emphasis should be placed on aromatics and cyclohexane production in the first step. Production of paraffinic fractions, desirable for olefin synthesis, must also be included in the first step in order to minimize production of refined by-products as required by the Economic Development Administration. The studies further indicate that large scale production of fertilizers should be included in the second step of development, employing a portion of the paraffinic tractions as feedstock.

Section IV: Step-wise Development

Plans for development of the core chemical industry are as follows:

Step I, Construction Stage - During construction of plants included in the first step of the industry (requiring a capital investment of $45,000,000) it is anticipated that 800-900 workers will be employed during approximately 15 months of field construction.

The plants to be built during this stage are shown on the accompanying flow chart and include facilities for hydrodesulfurization of feedstock, selective catalytic reforming, fractionation, solvent extraction, aromatics separation, hydrodealkylation and benzene hydrogenation. Associated facilities including docks, submarine lines, power plant, shops, warehouses, laboratory facilities and tankage will also be constructed at this time.

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Step I, Operation Stage

It is expected that first step manufacturing operations will furnish employment to 400 people in both direct employment and community support employment. At full capacity operation, charging 50,000 barrels per day of feedstock, the expected product volumes are summarized below. Also shown is the percent of estimated 1966 free world market demand for each of the petrochemical intermediates.

Product	Volume	% 1966 World Market
Cyclohexane	33 million gal/yr.	10
Benzene	30 million gal/yr.	3
Ethyl benzene	62 million lbs/yr.	2
Ortho xylene	68 million lbs/yr	9
Para xylene	49 million bls/yr.	5
Paraffinic fraction	8,000 B/D	
Motor fuel	24,800 B/D	

Step II, Construction and Operation Stages - The timing and nature of Step II investment will depend on profitability of Step I operations and on continuing market surveys. Phillips Petroleum Company has

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indicated a willingness to reinvest cash realized from operation of Step I plants. As envisioned in Table II attached to the "Financial Feasibility" section of this proposal, construction of second Step II plants will begin within two years after start-up of Step I.

Present plans for Step II investment include construction of an ammonia plant and a urea plant, capable of producing 1000 tons per day of urea. This quantity of urea represents 7% of the forecast free world demand for 1966. Investment in the ammonia and urea plants will be $26,600,000. Manpower requirements during the 15 month field construction period will be 500-600 men. The number of people engaged in both direct operation and community support will be raised to 650 persons.

Subsequent Steps, Construction and Operation Stages - The timing and nature of subsequent steps will depend on the profitability of Steps I and II and on continuing market surveys. As envisioned in the projected schedule of financial operations, construction of Step III plants will begin within three years after startup of Step II. Based on projected generation of cash from Steps I and II, plans call for $28,400,000 investment in Step III.

Since construction of Step III plants is several years in the future, and since petrochemical markets change continuously, it would be unwise to predict specific products at this time. Each primary petrochemical produced by the core industry is useful as a building block. Each serves as feedstock in a chain of manufacturing operations which ultimately produce consumer goods. Initially, the

plants carrying forward the chain of manufacturing operations are located outside Puerto Rico and primary petrochemicals are shipped to these plants. A core chemical industry built on a large scale, and initially sustained by outside markets, will produce low cost primary petrochemicals never before available in Puerto Rico. Experience indicates this opportunity will attract to Puerto Rico satellite plants for production of consumer goods. These plants will use steadily increasing percentages of core industry production, providing greatly increased employment and economic growth.

Plants to be built as part of Step III and subsequent steps are expected to include elements of one or more of the following process sequences:

Cyclohexane → Nylon salts → Nylon 66 → Fiber → Fabric

Cyclohexane → Caprolactam → Nylon 6 → Fiber → Fabric

Benzene → Phenol, Styrene, etc.

Ethyl benzene → Styrene → Polystyrene → Plastic products

Ortho xylene → Phthalic Anhydride → Plasticizers

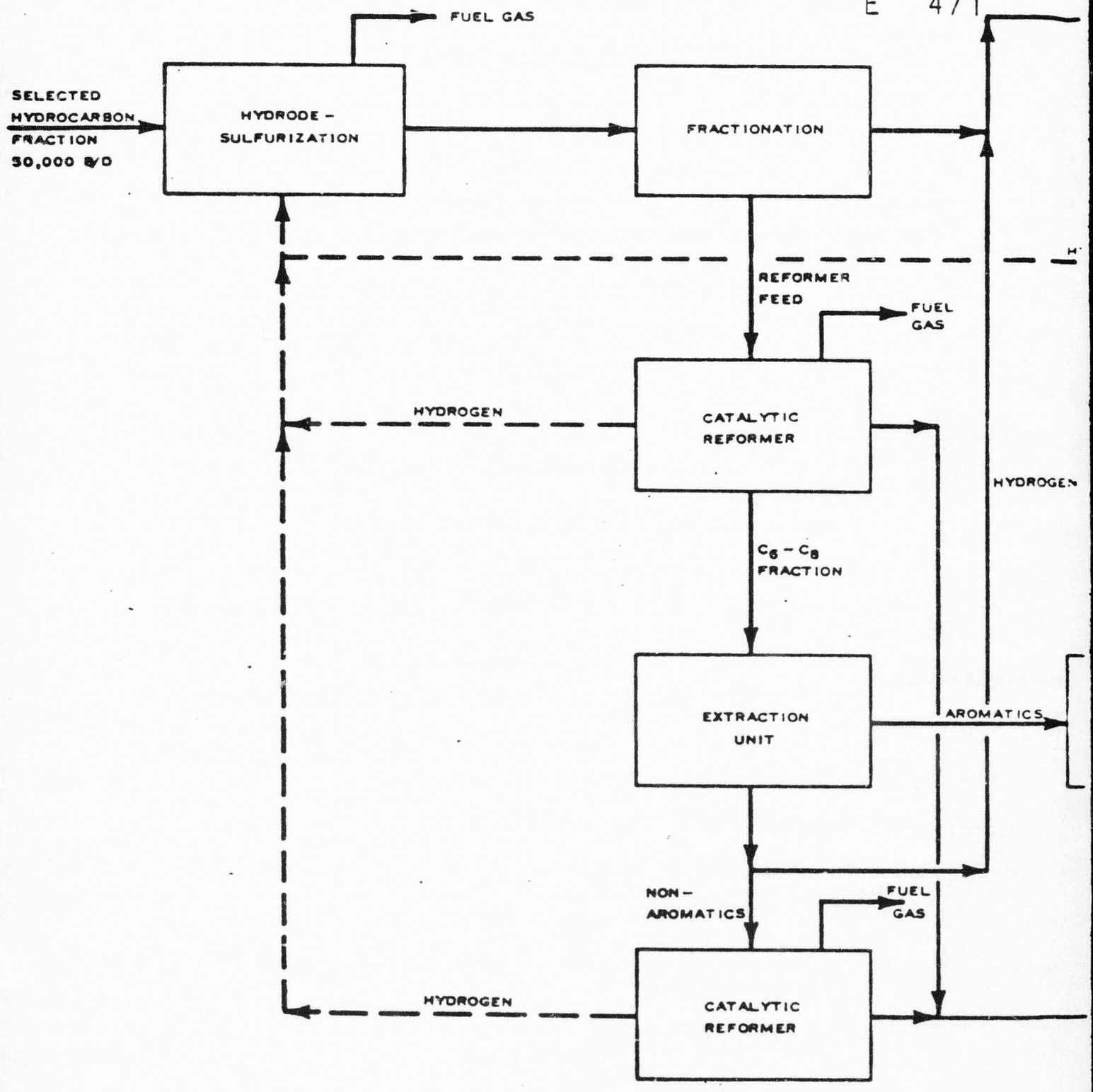
Para xylene → Polyesters → Fiber → Fabric

Paraffinic fractions → Ethylene → Polyethylene → Plastic products

It will be noted that these process sequences involve a chain of successive manufacturing operations. All of the steps in these chains need not be carried out at the same location. Future development of world markets may make it desirable to develop one or more chains completely in Puerto Rico at an early date.

On the other hand, it may be more attractive to proceed to intermediate steps in several of the chains, exporting higher value intermediates to world markets. Thus, the proposed core industry not only offers a sound base for expansion in Puerto Rico, but also retains a great deal of flexibility as to the direction, depth, and timing of such expansion.

It has been estimated that capital investment in the order of $300,000,000 to $500,000,000 would be required for full development of this core industry and its satellites. Manpower requirements for such development are estimated in the range of 9,000 to 14,000 people engaged in both direct operation and community support. Approaching this goal represents a great challenge to all participants.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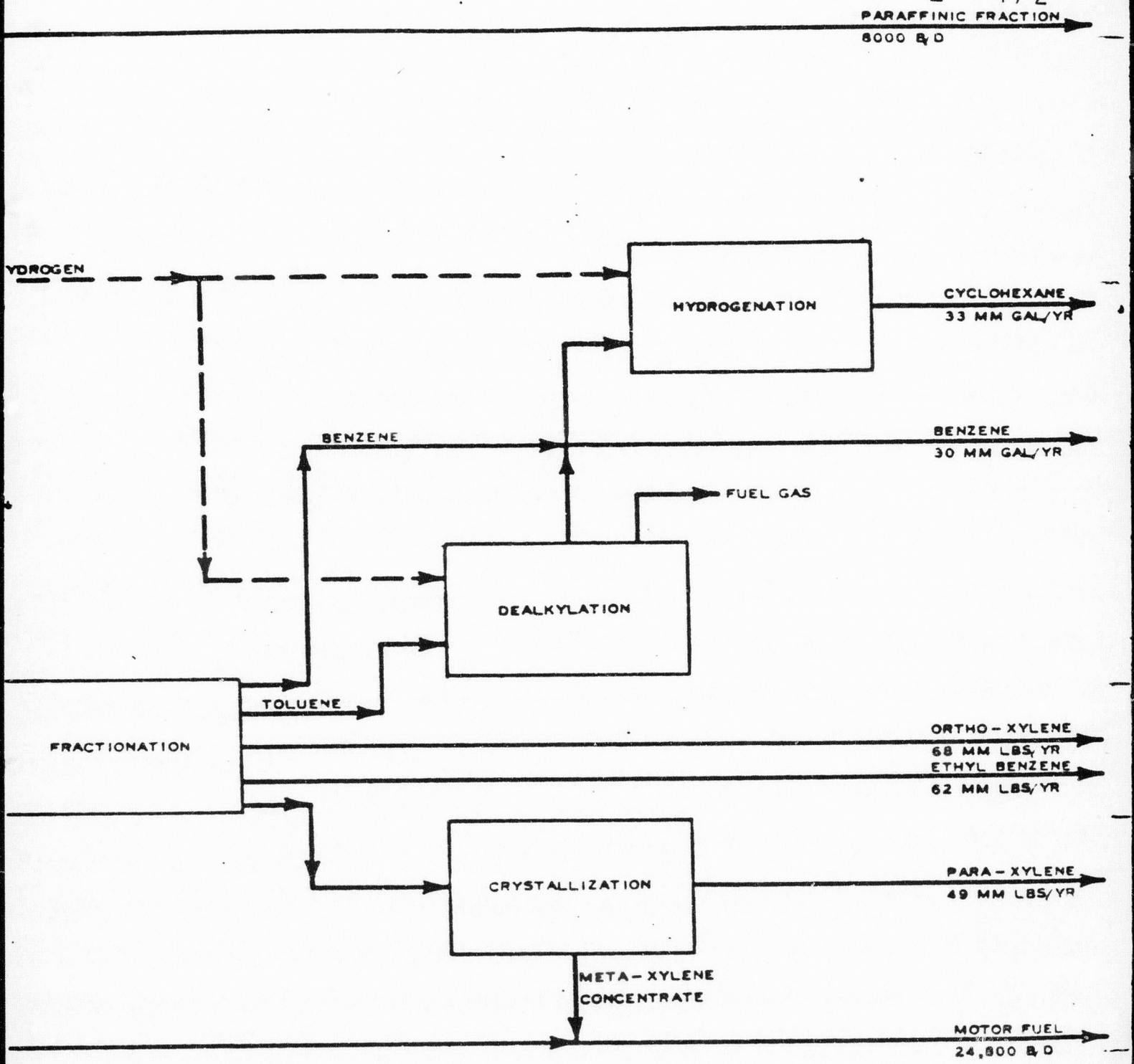

PROPOSED FLOW CHART
INITIAL OPERATIONS
CORE CHEMICAL INDUSTRY
FOR PUERTO RICO

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Section V: Financial Feasibility

It is expected that the core chemical industry in Puerto Rico will be organized using a corporate form in which the Puerto Rican public will be offered participation and that Puerto Rican investors will be represented on the Board of Directors of the new corporation. The financial feasibility of the project is set forth in the following Tables I and II. It is shown to be a profitable venture capable of supporting rapid growth. The project is attractive as a long term growth investment rather than in terms of quick realization of profits as dividends.

Table III shows a list of companies purchasing intermediate chemicals from Phillips Petroleum Company. These companies represent some of the possible investors in satellite plants during Step III and subsequent steps.

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TABLE I

ECONOMICS OF PETROCHEMICAL OPERATIONS IN PUERTO RICO
(Step I At Full Capacity)

Hydrocarbon charge		50,000 B/D
Capital		
On plot investment		$29,330,000
Off plot investment		15,670,000
Total Investment		$45,000,000
Working capital		$16,000,000
Pre-start-up and start-up expense		1,000,000
Total Capital Required		$62,000,000
Annual Income		
Cyclohexane	33,000,000 gallons	$ 6,270,000
Benzene	30,000,000 gallons	5,790,000
Ethyl benzene	62,000,000 pounds	2,348,000
Ortho xylene	68,000,000 pounds	2,373,000
Para xylene	49,000,000 pounds	3,499,000
Paraffinic fraction	8,000 B/D	3,961,000
Motor fuel	24,800 B/D	31,591,000
Total Major Products		$55,832,000
By-Product Credit (Fuel Gas)		8,000,000
		$63,832,000
Annual Operating Costs		
Hydrocarbon feedstock		$36,008,000
Direct and Indirect Operating Costs		9,540,000
Sales Expense		558,000
Total Expense (Before interest and depreciation charges)		$46,106,000
Annual Cash Flow (Before interest and income tax payments)		$17,726,000

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TABLE II

PROJECTED SCHEDULE OF FINANCIAL OPERATIONS IN PUERTO RICO
(Millions of Dollars)

Years After Project Approval	1	2	3	4	5	6	7	8	9
Operating Rate, % Capacity									
Step I	0	0	50	75	90	100	100	100	100
Step II	0	0	0	0	0	50	75	90	100
Step III	0	0	0	0	0	0	0	0	0
Investment added	20.0	25.0	0	12.0	14.6	0	0	13.0	15.4
Investment @ year end	20.0	45.0	45.0	57.0	71.6	71.6	71.6	84.6	100.0
Working capital added	0	10.0	3.0	3.0	3.0	1.1	1.1	0	3.5
Working capital @ year end	0	10.0	13.0	16.0	19.0	20.1	21.2	21.2	24.7
Total capital @ year end	20.0	55.0	58.0	73.0	90.6	91.7	92.8	105.8	124.7
Pre-start-up & start-up expense	0	1.0	0	0	0.6	0	0	0	0.6
Cash flow before interest and income tax	0	0	5.7	11.4	14.8	20.3	23.4	25.3	25.8
Interest charges	0	0.8	2.2	2.6	3.0	2.9	1.9	0.7	0
Cash used for loan repayment	0	0	3.5	8.8	11.8	17.4	21.5	11.6	0
Cash reinvested	0	0	0	0	0	0	0	13.0	18.9
Cash to depreciation, income tax and dividends	0	0	0	0	0	0	0	0	6.9
New loans required	0	36.8	3.0	15.0	17.6	1.1	1.1	0	0
Outstanding loans @ years end	0	36.8	36.3	42.5	48.3	32.0	11.6	0	0
Equity Capital	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

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TABLE III

CUSTOMERS OF PHILLIPS PETROLEUM COMPANY

FOR INTERMEDIATE CHEMICALS

DOMESTIC

AB Chemical Company
Alamo Chemical Company
American Cyanamid Company
Celanese Chemical Company
Dow-Badische Chemical Company
Dow Chemical Company
E. I. DuPont de Nemours Company
Eastman Kodak Company
Frontier Chemical Company
Goodrich-Gulf Chemical Company
Hercules Powder Company
Hess Oil & Chemical Company
Monsanto Chemical Company
Rohm and Haas Company
Shell Chemical Company
Texas Butadiene & Chemical Company
Texas Eastman Company

INTERNATIONAL

Badische Anilin - & Soda - Fabrik (W. Germany)
Mitsui (Japan)
Progil (France)
Rhone-Poulenc (France)
Sicedison (Italy)

Section VI: Capability of Phillips Petroleum Company

On the following pages are remarks made by executives of Phillips Petroleum Company before the New York Society of Security Analysts on September 26, 1963. These remarks, which present current information concerning all phases of Company activity, clearly demonstrate the capability of Phillips Petroleum Company for successful sponsorship of a core chemical industry in Puerto Rico.

Remarks of K. S. Adams

MEMBERS AND GUESTS
OF THE
NEW YORK SOCIETY OF
SECURITY ANALYSTS

We are honored to be invited again to appear before your key society, and pleased to have the opportunity of presenting a brief up-to-date picture of Phillips and a good look at its future.

Appearing with me today are our other top officers. They are Paul Endacott, Vice Chairman; Stanley Learned, President; W. W. Keeler, Chairman of our Executive Committee; and John M. Houchin, Executive Vice President. Mr. Robert N. Sears, Vice President and Manager of our New York office, who is here today, stands ready at all times to be of service to you.

Phillips has made much progress in the three years since we were last here. During this time annual dividend payments have been increased 30 cents a share and presently are at a rate of $2.00.

The Company is in a strong financial condition. At July 31, cash and short-term securities totaled $183,000,000, the largest ever except for a few times just following a major financing issue, and our total cash is equal to 75% of total current liabilities. For many years we required more funds to meet our growth needs than we could generate internally, but our position with respect to long-term debt and provision of funds was reversed about five and a half

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years ago. Between January 1, 1958, and August 1 of this current year, we retired $125,000,000 of debt, met capital expenditure needs of $808,000,000, and paid dividends totaling $331,000,000. Internal sources more than covered this combined need for $1,262,000,000, and additional substantial funds were invested in stocks such as those of Pacific Petroleums Ltd., Purex Corporation, and Union Oil Company of California. As you know, we sold our Union stock in July for a little over $100,000,000. Phillips realized a profit after income taxes on this sale of $33,440,000.

Over the years we have made sizeable expenditures for offshore leases in the Gulf of Mexico and for concessions in foreign lands. We have succeeded in proving substantial oil and gas reserves on a number of blocks of this acreage and have evidences of good prospects on large portions of the remainder. Our testing and evaluation has also indicated that some of this acreage will be relinquished over the next several years, and we have decided that we should make provision this year for the potential future write-offs of some of these lease and concession costs. Therefore, in this quarter we have set up a reserve of $25,000,000 for these future write-offs. The charge to current earnings for setting up this reserve will, in effect, offset a large portion of the non-recurring profit from the sale of the Union Oil stock.

It is too early to forecast our earnings for the full year of 1963, however we are guessing they will exceed last year's.

We expect that capital expenditures in 1963 will be greater than the $156,000,000 in 1962, somewhere around $165,000,000.

The Company is in an exceedingly favorable position to increase its earnings in future years, and the speakers to follow me will tell you of a number of those factors which mean strong earnings growth.

It is now my pleasure to introduce Mr. Endacott.

Remarks of Paul Endacott

To be brief and clear, the multi-faceted Phillips story will be told today with the aid of pictures and charts. These may suggest generally the course of the Company's future growth. From time to time, we hear comments that run something like this - - "Obviously, Phillips is sort of a three-in-one company majoring in natural gas, petrochemicals and the regular oil business, but its basic business philosophy seems to be different too." I desire to respond to that observation by furnishing a brief policy background against which you may view the presentations of our various parts to follow, observe how these parts fit together, and identify their separate roles.

Our general business principles are evident in what we do, which, according to the old adage, speaks louder than what we may say. It is a Phillips tradition that due recognition must always be

given to the future when acting in behalf of the present. Accordingly, our owners' initial investments and annual retained earnings must be employed so effectively that ample dividends will be paid currently while building a massive core of genuine values to underwrite future income.

Interwoven into the broad pattern of our present operations and projects are principles which have been evolving since the beginning of the Company in 1917. Then the industry centered its attentions almost exclusively on crude oil. Natural gas, especially casinghead gas produced with crude, and the lighter hydrocarbon vapors entrained in this gas held little interest. Confident, however, that great potentialities lay in these then neglected raw materials, Phillips set forth on a bold long-range program to conserve them, acquire more, and develop new uses. Before long, these policies had made Phillips the industry's leading producer of natural gas liquids and marketer of natural gas.

Without detracting from these earlier accomplishments, it must now be recognized that they came about mainly be capitalizing upon latent opportunities and underlying trends. On the other hand, the Company's recent growth owes more to genuine creativity - - new processes, new products, new devices, and new methods.

Aside from natural gas and natural gas liquids, there are many other activities in which the Company has reached a position at or

very near the top of the industry. Among them are: reliance upon basic and applied scientific research; number of U. S. patents obtained annually and held in total; production and distribution of liquefied petroleum gases; fractionation and marketing of special hydrocarbon components of natural gas liquids; separation of the components of natural gas liquids and marketing them "as such;" reserves of lighter hydrocarbon raw materials required in the manufacture of petrochemicals; size and diversification of chemical output; origination and volume of carbon blacks made from liquid feedstocks instead of from gas; development and variety of synthetic rubbers; production of nitrogen-based fertilizers; invention and manufacture of plastics; participation in atomic energy activities; and the creation of unique instruments and systems for automation of producing and manufacturing operations, electronic simulation of projected new processes, and mobile computer diagnosis of plant operations.

Such achievements translate into a sort of business philosophy as follows: Phillips searches to uncover unconventional opportunities well in advance of their general acceptance; relies largely upon itself to develop new processes and products; proves its new developments commercially in its own operations and then licenses them to others; prefers the more complex and difficult types of operations which some competition will be reluctant to undertake; practices broad diversification, but with balance;

takes calculated risks, particularly with regard to products upgraded from petroleum raw materials or relating to forms of energy; foregoes present benefits in exchange for sufficiently greater future ones; employs a high ratio of technical graduates in operating functions; develops supervisory and managerial talent from within while infusing fresh viewpoints by freely transferring personnel among unrelated activities; and seeks to maintain, insofar as feasible and profitable, a chain of integration all the way from raw material sources to consumers.

Now Mr. Houchin will discuss exploration and production. Mr. Keeler will follow with research and development, refining and natural gas liquids processing, and chemicals. Then Mr. Learned will summarize natural gas, supply and transportation, and sales after which Mr. Adams will conclude our presentation.

Remarks of John M. Houchin

INTERNATIONAL

Our growing international activity is one of the sources of built-in earning power that promises continued solid profit growth for Phillips. Already contributing to earnings is Phillips foreign crude production, currently about 79,000 barrels a day or 40% of the Company's total. Production comes from interests in the Middle East, Venezuela and Canada. We have discovered large gas-condensate reserves and lately, oil, in the Algerian Sahara. Exploration interests range from Canada and Latin America to Australia,

from the North Sea to Spain and into the Algerian Sahara and Libya.

Other speakers will cover our international manufacturing and sales activities, but to set the stage at this point I will mention a few over-all facts. We have refining interests in four foreign countries, and petrochemical manufacturing ventures in six. Our process and product patents are licensed in 15 nations outside the U. S. At latest count, our products were going to customers in 50 countries. We have numerous sales offices throughout the world to serve customers and acquire new ones. A recent study shows that we can expect rapid growth in foreign sales and licensing earnings over the next several years.

EXPLORATION AND PRODUCTION - INTERNATIONAL

Let us now take a closer look at some of our foreign exploration and production activities.

Large reserves of oil and of additional gas and condensate have been found on two concessions in Algeria, and another oil field has been discovered on our 56% interest, 25,000-acre Lot 17 Block in Lake Maracaibo, Venezuela. The Venezuelan well found thick oil sand sections and flowed at the rate of 4,800 barrels a day on initial tests. The well is three-fourths of a mile southwest of a large 1962 discovery which extended the shallower main field on this concession. The new discovery not only substantially increases our reserves on this prolific block, but will be developed into a source of additional income starting early in 1964.

Net crude oil production from our entire Venezuelan holdings is estimated to average 32,200 net barrels of oil daily during the first eight months of this year.

Now let us turn to the vicinity of the Mediterranean Sea where we have approximately 733,000 net acres distributed in the Sahara Desert of Algeria, 5,880,000 net acres of both onshore and offshore concessions in Libya, and 300,000 net acres in Northern Spain.

Prior to 1963, four gas-condensate fields were discovered on a 25% interest Algerian Sahara block operated by our French partners. Two of these fields have two pay sands, and the larger field is one of the biggest gas reserves in Algeria. Early this year, oil was discovered beneath the gas cap in the lower sand of this field by a well which is capable of producing over 4,000 barrels of high-gravity oil per day. A 5 1/2 mile stepout well in the same pay sand of this field has recently flowed oil at high rates on two drillstem tests and is still drilling ahead in the pay section. This well confirms the presence of a major oil field.

Twelve miles to the south, on a block in which Phillips owns 50% interest, oil and gas have just been found in a new discovery well whose potential has not yet been tested. Two other favorable prospects have been mapped by seismograph on this block, one of which is indicated to be productive of gas-condensate by a nearby well of another company. These prospects will be drilled in the near future.

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Steps are being taken which will lead to producing the gas-condensate wells and extracting the natural gas liquids, and we anticipate marketing both the liquids and the gas around 1965 or 1966. The potential volumes are large and could return millions of dollars in profits annually. Phillips and its partners also are working toward participating in a new pipeline which would enable anticipated crude oil deliveries from the block to the Mediterranean possibly starting in 1964.

So far, our recent, initial exploratory efforts in Libya have been only partially fruitful. In late 1962 the first well drilled on one of our three full-interest tracts flowed oil at the rate of 2,300 barrels daily. Subsequent exploratory drilling has been non-productive. Additional exploratory work is being conducted in Libya.

Two exploratory wells 125 miles apart offshore Libya, recently abandoned after non-commercial oil shows, have tested only small portions of a 50% interest 6,700,000 acre concession in the Gulf of Sirte. Another wildcat has been started 25 miles from the second well.

We have been represented in the Middle East for some time through our stock interest, now 37%, in American Independent Oil Company, which holds an undivided 1/2 interest in a 2,500 square mile concession in the Kuwait Saudi Arabian Neutral Zone. Thick oil sands were found on this concession in 1953, and for the first

eight months of 1963 this interest yielded to Phillips a daily net share of 34,100 barrels of crude oil. Recently Aminoil discovered and is developing a new oil pool in a new zone 3 1/2 miles south of the main producing field, and this zone has since been found productive in the older tield. These developments soon will materially increase Neutral Zone production.

A new 100,000 barrel a day refinery unit began operating in the Neutral Zone in early 1962, and the output is being marketed chiefly in France, Germany, Italy, and Japan. American Independent also has a share of about 13,000 barrels a day of Iranium Consortium crude production.

Phillips is one of the companies which is engaged in active offshore seismic operations in the North Sea, now a prime center of interest for geophysical exploration. Some believe that this area may be likened to the vast Permian Basin of the United States as a favorable area for oil and gas production. Its advantageous proximity to large European markets is obvious. Our work is in waters adjacent to England, Norway, and Holland.

Phillips has an important stake in Canada through its stock ownership in Pacific Petroleum Ltd. We currently own 41% of Pacific's outstanding shares, but tomorrow Pacific's stockholders will vote on a proposal to sell Phillips 1,672,471 additional shares of Pacific stock, which would increase our interest to 46%. Pacific plans to apply resulting funds to its recent purchase of all Canadian

the domestic search for oil and gas. Most of the potential shallow oil and gas bearing formations of consequence in this country have been explored with the drill and we are now going much deeper in search of hydrocarbon reserves. Gas is more likely to be found at the deeper depths than is oil. Since wells grow progressively more expensive with depth, careful consideration must be given to the price which may be obtained for gas in planning for deeper exploration.

An example of a deep gas well which you may have read about recently is one in Pecos County, Texas, which at 19,830 feet is the world's deepest producer. We have an 11% interest in the 3,800-acre tract on which the well is located, and 5,200 net acres adjoining the tract and in trend to the south.

Also this year a full-interest wildcat discovered gas and condensate on an 11,000-acre lease block near the prolific Chocolate Bayou field south of Houston, and a half interest well found gas and condensate on a 5,700-acre block in Jackson Parish, Louisiana.

We continue to increase our oil and condensate reserves on acreage offshore Louisiana. Two wells drilled this year have extended existing gas-condensate fields on separate blocks off Cameron and Terrebonne Parishes, Louisiana, and a successful wildcat supported by us has discovered gas condensate offsetting a 5,000-acre block off Iberia Parish.

Phillips and a partner, in a 50-50 venture, are jointly developing a shallow multi-pay oil and gas field in five blocks comprising 25,000 acres in Breton Sound, offshore Louisiana. The field is now nearly

holdings of El Paso Natural Gas Company. These choice holdings include some of Canada's largest natural gas reserves. They thus add to Pacific Petroleums' strong combination of promising acreage, reserves, production, manufacturing and sales.

Pacific's refined products for motorists are marketed under the Pacific 66 brand. Pacific's net crude oil production averaged more than 20,100 barrels daily during the first six months of 1963, up 24% from the year earlier period, and its natural gas production rose to 173,000,000 cubic teet a day. An examination of the tremendous potential of this concern - - which is busily developing its huge acreage holdings and turther commercializing its growing production - - can't help revealing that it will pay off handsomely in future years.

Pacitic Petroleums is constructing the world's largest natural gas liquids extraction plant near the town of Empress, Alberta. When completed in the first quarter of 1964 it will strip approximately 20,000 barreis a day of liquids from natural gas traveling through the trans-Canada pipeline.

A 600-mile, six-inch pipeline under construction will transport liquefied petroleum gas from the plant to distribution terminals planned in Saskatchewan and Manitooa Provinces as far east as Winnipeg.

EXPLORATION AND PRODUCTION - DOMESTIC

Although we have been directing an increasing proportion of exploration and drilling funds into foreign activities, we are continuing

the domestic search for oil and gas. Most of the potential shallow oil and gas bearing formations of consequence in this country have been explored with the drill and we are now going much deeper in search of hydrocarbon reserves. Gas is more likely to be found at the deeper depths than is oil. Since wells grow progressively more expensive with depth, careful consideration must be given to the price which may be obtained for gas in planning for deeper exploration.

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1-32

continuous for five miles. During the past year, 11 oil and gas wells have been completed, six of them dually. The field now has 28 oil and gas wells in seven pay sands, with six additional potential pay zones.

Just a couple of weeks ago we discovered a new oil field on a full-interest, 10,700-acre block in McCone County, Montana.

In Montague County, Texas, a wildcat this year discovered good amounts of oil in two zones on a one-half interest block. We have also discovered oil on a full-interst 800-acre block in Simpson County, Mississippi.

Other important wells which have added to our crude oil, natural gas, and gas liquids reserves include part-interest gas discoveries in Wheeler and Montgomery Counties, Texas, and in the Permian Basin, New Mexico.

Domestically, Phillips thus far is having a considerably better-than-average year both in the results ot exploratory drilling and in development of new reserves of oil, condensate, and gas. We are optimistic about bringing in new production around many of our recent discoveries, most of which also are so located as to justify early development.

Phillips total domestic and foreign crude oil and natural gas liquids production, including interest in affiliates, has increased about 62% during the past ten years. Our production of these materials averaged 308,000 barrels a day during the first eight

months of this year, compared to an average of 294,000 barrels a day during the same period in 1962. Total domestic natural gas liquids output averaged a record 109,000 net barrels daily during the first eight months of this year. U. S. crude oil production was 4,000 barrels higher due chiefly to better allowables and development of new production offshore Louisiana and California.

Secondary recovery projects now account for about one-fourth of our domestic crude production. Phillips has long been a leader both in promoting field unitization and secondary recovery projects and in the technology of recovering every possible barrel of oil from known reservoirs.

In the past several years an increasing portion of our crude oil has been produced outside the United States and we expect this trend to continue even though domestic production increases. Also, foreign production of natural gas liquids should grow as markets abroad are developed and expanded.

Both in our crude producing and natural gas liquids extraction operations, we have taken many steps to further increase efficiency and reduce costs, and we are further analyzing such possibilities. Typical is a Phillips-operated California offshore lease, where 24 wells were drilled from one offshore platform, and equipment on this platform is now producing all of the wells. We have applied our broad know-how in automation to producing and natural gas

liquids operations. In a number of oil fields all of our producing functions are fully automated.

As the leading producer of natural gas liquids, Phillips now has interest in 54 domestic natural gas liquids extraction plants, 29 of them wholly owned. It also has the industry's two largest centers for separating the many different components of these choice materials.

In addition to the natural gas liquids which we produce, we also buy about 98,000 barrels daily of these materials. These liquids not only add to the volume of our raw materials supply, they add materials that are versatile. They furnish ideal building blocks for chemicals, and after highly selective separation and complex chemical processing they also are used as powerful, quality-adding blending stocks in motor fuels and aviation gasoline. They enable the Company to control not only the volatility but also other qualities of Phillips motor fuels and add to the volume by blending gasoline refined from crude oil with a high percentage of natural gas liquids. Phillips leads major brand marketers in blending desirable natural gas liquids components in automotive gasolines.

HELIUM

During 1961, the U. S. Government initiated a large-scale program for the conservation of helium. Helium plays an important role in making and operating atomic reactors, rockets, and missiles; it also has many research, industrial, and medical applications.

As a part of this program, Phillips was awarded a $13.7 million a year U. S. Goverment contract under which 15.7 billion cubic feet of irreplaceable helium will be conserved over a 22-year period from two plants we have built in the Texas Panhandle. One of our plants, designed by Phillips, is operating at capacity, but along with other plants in the program we have had start-up troubles at the second plant where we bought a packaged design. Production from the Phillips plants will be approximately 25% ot the total volume of the Government's helium conservation program.

Remarks of W. W. Keeler

RESEARCH AND DEVELOPMENT

Now let us turn to research and development - - that vital element which originates many of our new enterprises, and renders special services to them after they are under way. Unfortuantely for such a discussion as this, most of our many new research fruits cannot, for competitive reasons, be opened for inspection during their embryonic stages between conception and commercialization, but I can say that several unique new profit sources are maturing in addition to some of the recently commercialized projects I shall mention. The importance of our research and development can be illustrated by the tact that four major products and several others we are making or are about to make commercially were not even known 10 years ago except perhaps to a few research people.

Phillips is widely recognized as having one of the most able research and development organizations in the industry. In recent years this organization has been attacking many tough problems with coordinated teams made up of technologists from each of several branches of engineering and science. This "multiple discipline team" system of Phillips has proved a highly successful approach to today's vastly complex and far ranging research and development problems.

A good example of the effectiveness of this team approach is the work we have been doing in the relatively new field of cybernetics, in which Phillips has been recognized as a leader in the petroleum industry. Encompassing as it does the whole field of electromechanical communication, computation, and control systems, it is applied in our case to chemical and physical processes. It is broader than "automation" alone because with complex electronic and mechanical technology it links the whole thought and decision-making processes of man from the beginning to the end of an operation. Cybernetics lends itself especially to coordinated work of teams of experts from various scientific and engineering branches. Its application already has brought additional earnings from cutting costs and improving efficiency. Extension of these techniques offers untold possibilities for future profit building.

Systems now in operation at our processing units automatically control operating conditions more precisely than any human capabilities will allow. We also simulate on electronic models all

operating functions and conditions of new processing systems before we design the actual plants.

Two years ago Phillips introduced an aviation jet fuel additive for preventing dangerous icing in aircraft jet fuel systems. Further experimentation confirmed that this product also kills bacteria and molds which can partly obstruct jet fuel systems and contribute to troublesome corrosion of aluminum and other materials, so the additive now has this additional valuable use. Out of over 200 materials tested, this is the only anti-icing additive which is adopted and used by the U. S. Military and approved by the Federal Aviation Agency for commercial airlines. Currently its use is licensed through four U. S. and two foreign suppliers.

As an outgrowth of our synthetic rubber research, Phillips developed and is manufacturing a product which is being used increasinly in the nation's arsenal of missiles. This product, Butarez CTL, is a binding agent for solid rocket propellants. An additional plant is authorized and being designed to meet the requirements of solid rocket propellant manufacturers for this valuable ingredient.

Phillips research developed Cis-4, the superior cis-polybutadiene synthetic rubber that is replacing much natural rubber in tires. We are continuing to work diligently in the development of many new synthetic rubbers. One field we are investigating is that of ethylene-propylene rubbers. These offer a particular challenge because ethylene and propylene are less expensive synthetic rubber raw materials than the butadiene and styrene presently in widespread use.

The Company is a large manufacturer, user, and seller of both ethylene and propylene.

Our fractional crystallization process, which we have long used for the production of paraxylene, has been licensed by a U. S. company and by a company in England which is already enlarging its facilities. This process also offers licensing profit possibilities to Phillips in the removal of water from foods and beverages.

One of our newest achievements is the polypropylene process used in a new plant being built near Houston by Alamo Polymer Corporation, owned 50% by Phillips. Extensive pilot planting at our research center went into the development of this highly streamlined, very efficient process.

We are also carrying out intensive, broad research and development work on other potentially profitable plastics, synthetic fibers, insecticides, improved fuels and lubricants, new and better catalysts and processes, and advanced exploration, drilling, and production techniques.

Phillips operates nine nuclear reactors, a chemical processing plant, and other facilities for the Atomic Energy Commission at the National Reactor Testing Station in Idaho. Another reactor to be operated by us is being built. Nine of the ten reactors are based on our conceptual designs. The newest reactor will supplant another Phillips-operated reactor as the world's most advanced test reactor when completed in 1964. A $40 million facility, it will be used primarily for development of naval reactor cores.

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In 1961 the AEC extended its contract with Phillips for operation of the NRTS facilities for another five years - - to 1966.

In its own laboratories, Phillips employs two accelerators, or "atom smashers," in radiation research on oil and gas reservoirs, and petroleum and chemical processing.

Our patent assets are one indication of our research and development strength. As has been the case for many years, Phillips during 1962 ranked second in the oil industry in the number of U. S. Patents issued and in the total number owned at year end. Moreover, we were ninth in this category of all U. S. industrial corporations.

Patents and related know-how are a source of millions of dollars of earnings annually. Based solely on present commercial developments, such income should increase about 50% within five years.

REFINING AND NATURAL GAS LIQUIDS PROCESSING

Average crude runs through six domestic refineries during the first eight months of the year were about 249,000 barrels daily. We processed an average of approximately 170,000 barrels a day of natural gas liquids at our two huge natural gas liquids processing centers.

Let us look now at the results of steps to lower unit costs and increase over-all efficiency through technical advances and plant improvement. We have made great strides in reducing unit costs, and just recently we had a study made which put into specific dollar values some expected future results of these programs. You will be

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interested to know that expected earnings improvements, solely from plant modernization and improved use of manpower, utilities, supplies, and repair materials and excluding expansion projects, total several million dollars in 1964 alone.

Our fastest growing processing center is at Sweeny, Texas. Here is our largest crude oil refining complex as well as our second largest natural gas liquids processing center.

We are installing a computer system on the Sweeny natural gas liquids facility which will automatically control operating conditions of six of the fractionation columns which separate certain light hydrocarbons from the feed stream. This automatic control is expected to increase capacity by 15% without any increase in operating costs.

Natural gas liquids components separated in this large fractionating center become motor fuel blending stocks with especially desirable qualities, feedstocks for adjacent ethylene units having a capacity of 500,000,000 pounds per year, for cyclohexane which is a synthetic fiber intermediate, and for benzene.

The newest unit at the Sweeny complex is a propylene concentrate unit which was placed in operation earlier this year. It produces extremely high-purity propylene, much of which will be used in Alamo Polymer Corporation's new polypropylene plant.

New butadiene purification facilities at Sweeny, recently placed in operation, remove undesirable impurities in the butadiene concen-

trate and increase its value in the manufacture of petrochemicals.

Our most recent refining venture is in India. We have entered into an agreement with the Indian Government to form a company, Cochin Refineries, Ltd., which will construct and operate a 50,000 barrels a day oil refinery at Cochin in South India. Phillips will own 25%, the government of India 51%, and private Indian interests the remaining shares of the new company. Phillips will handle technical design and construction of the refinery, furnish the managing director, and arrange to supply any imported crude oil needed. It will be India's fourth partially state-owned refinery.

PETROCHEMICALS

There is nothing magic about petrochemicals. A company can't plunge into petrochemicals and expect a profit. There are critical ingredients a company must have to meet the intense competition in this field and bridge the gap between failure and success. These include: the proper raw materials; the right kind of scientific team; flexible, related, non-petrochemical facilities; adequate potential markets; research-oriented sales people; and constant awareness of the intense competition in this field.

Even the experts cannot agree on whether particular products are or are not petrochemicals. Therefore, figures claimed to report earnings from petrochemicals of various companies each result from separate arbitrary assumptions, and do not provide a common basis for comparison. We ourselves do not think of specific parts of our

business as "chemical" or otherwise, but regard them on their merits as profit makers.

The Phillips polymerization process to produce high-density thermoplastics was the first to be discovered, developed, and commercialized by an American firm. Marlex polyethylene was offered in commercial quantities in February 1957. Marlex represented a whole new family of olefin polymers, and specially tailored resins have been brought out for specific needs. More than 30 types and series of Marlex plastics are being marketed now. Our process is licensed to 11 companies in the U. S. and abroad.

Sales volume of Marlex resins increased 15% in the first eight months of 1963. Contributing chiefly to this volume rise were sales of Marlex for the swiftly growing bleach and detergent bottle and packaging markets. We supply about one-fourth of the resin needs of U. S. plastics bottle fabricators.

As to penetration of additional markets held by other materials, polyethylene has just about eliminated wax in milk-carton coating, is pushing glass out of the bleach and detergent-container business, is moving rapidly into the paper-bag field, is taking a big bite out of the wire and cable coating market, and is about to enter the motor oil container field as a liner for paper and foil cans. In addition to these markets and numerous other uses, our Marlex is displacing wood in soft drink cartons, and metal in many pipe uses. In the latter area, we have started manufacture, sale, and contract in-

stallation tor oil field use of pipe made of Marlex resin and expect growth for this business.

In view of the bright tuture we foresee for Phillips in plastics, we have taken numerous steps to expand and more completely integrate in this field.

Alamo Polymer Corporation, in addition to its new polypropylene resin plant near Houston, is building a plant to make film from the resin at Stratford, Connecticut. Both plants are scheduled tor completion in late 1963, and our 50% interest in Alamo should start making protit contributions in 1964.

We also own half of A-B Chemical Corporation which last year purchased an existing plant near Houston making 150 million pounds a year of low and medium density polyethylenes. We had previously been acquiring and marketing conventional polyethylene trom this plant, which uses ethylene from our Sweeny facilities.

Just last month we acquired as a full interest subsidiary the Wall Industries, Inc. Headquartered in New York City, this 133-year-old company has 13 subsidiaries and two affiliates manufacturing and selling rope, jute, carpet yarn, metal tubing, oakum, and other materials, many of which provide additional markets for our polyethylene and polypropylene plastics.

Among our wholly owned plastic fabrication interests are Mehl Manufacturing Company, which manufactures and sells packaging film, machinery, and plastic bags and containers; H. P. Smith Paper Company, which coats paper with Marlex polyethylene and

other coating materials, and Formed Container Corporation, which makes a variety of plastic containers. We expect rising earnings to accrue to Phillips from these and other acquisitions in chemical materials and fabrication fields.

Phillips entered synthetic rubber as an active participant well before entry of the United States into World War II, from little known but considerable previous research on raw materials for rubber. The Company constructed and operated one of the first butadiene plants in the nation's synthetic rubber program.

About the same time, our research resulted in another industry first - - oil furnace carbon black - - which made possible the successful use of the new synthetic rubber for tire treads and led us to construction of the world's largest furnace black plant. In the meantime, our research on "cold" rubber and development work in the first "cold" rubber pilot plant had tipped the balance to synthetic over natural in a large portion of the postwar market. Phillips soon became a major manufacturer of the finished synthetic rubber polymers - - the first to do so from the principal raw material, butane, to finished product.

Four years ago we introduced our superior Cis-4 polybutadiene rubber. This high-performance material has been a profit maker for our Company almost from its start.

Cis-4 is not only superior to conventional synthetic rubber, but also superior to natural rubber, and its man-made equivalent, polyisoprene, in treadwear and other properties, including traction and

blowout resistance. Although Cis-4 is slightly higher in price than most types of natural rubber, it advantageously utilizes more carbon black and processing oil than natural, with the result that processing costs and prices of finished rubber compounds are lower.

Six companies in the U. S. and abroad have been licensed to use the Phillips process. The latest is General Tire and Rubber Company, to whom we in 1962 sold an interest in our 30,000 tons a year capacity cis-polybutadiene plant near Borger, Texas.

At a modified portion of Plains Copolymer Plant near Borger we have begun modest-scale commercial production of several newly developed specialty rubbers, trademarked Solprene. These new polymers offer particular advantages in the manufacture of such large-volume, tough-use products as wire and cable coatings, shoe soles, and floor coverings.

Phillips manufactures more nitrogen fertilizers than any other oil company and is the second largest producer in the United States. We have been operating our ammonia plants at capacity to supply demand.

We have contracted to supply ammonia from our Adams Terminal plant to a urea plant being built near Houston by another company. Phillips will market urea produced at this plant when it is completed early in 1964, thus rounding out our lines of marketed nitrogen fertilizers.

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At our ammonium nitrate plant in the Texas Panhandle we have made several improvements to reduce costs, refine product quality, and provide better customer service.

Phillips Pacific Chemical Company, a 51% owned affiliate, is constructing a new plant at its Kennewick, Washington, facilities, which will produce a urea-ammonium nitrate solution, thus broadening the fertilizer products available to supply the needs of agriculture in the area.

We are expanding our petrochemicals activities overseas at a rapid pace.

Phillips has half-interest in companies which in 1960 and 1961 built new carbon black plants in France, Italy, and South Africa, all operating at capacity to supply demands. Phillips has 30% interest in another more recent such project in India, and 10% interest in one in Mexico. All five plants were built under Phillips process licenses, as were two plants of other companies. Operation of these new plants along with building of markets has reached the stage where two of them will start returning earnings to Phillips in 1964. This is another example of built-in values ready for the payoff.

Phillips has received authorization of the government of France to construct a butadiene plant at Bordeaux.

Petrochemical manufacturing facilities are to be constructed in Spain by a new company, which is owned 31% by Phillips. Included

and which was a sequel to the famous Supreme Court "Phillips decision" in 1954, held that the Company's rates under consideration were not excessive. Last May, the Supreme Court upheld that decision.

Certain intervenors have requested a rehearing of this case and a decision by the Supreme Court on this is expected soon. If the rehearing is denied this particular rate case will be closed. The granting of such rehearing or even a reversal by the court of its decision would not set any new gas rates, but merely require the Federal Power Commission to reconsider its actions and to eventually come out with a new decision.

The fifth question is, "What is the future for Phillips domestic gas business?" Gas demand will continue to grow. Although most of the really huge gas fields in accessible, shallow formations in this country probably have been discovered we believe that there are still good reserves available in deeper, less accessible formations. Regardless of some of the "pie in the sky" predictions of future supplies of gas in the United States, such supplies are going to be exceedingly expensive to find and develop. When the price incentive becomes sufficient and dependable enough to search for these more costly gas deposits, we will again step up our domestic gas exploration.

A primary function of price is to protect the consumer in the matter of supply, and it is inevitable that the price incentive will

will be plants to extract butadiene and to make Marlex high-density polyethylene, carbon black, and synthetic rubber, the latter three products to be marketed under Phillips trademarks. A new Spanish sales company, owned 50% by Phillips, has been formed to sell the products manufactured in the new facilities as well as other Phillips products. The sales company will construct a sales service laboratory for product development in plastics and rubber chemicals.

Remarks of Stanley Learned

NATURAL GAS

Income from U. S. and foreign natural gas sales rose 229% from 1951 through 1961, when it reached a peak of $112,000,000. Gas income for the first eight months of this year was up about a million dollars over the same period last year, and we expect this year's income to exceed the $108,000,000 in 1962.

Several questions about our natural gas business have recently come to us from analysts, and I shall try to answer some of them.

The first question is, "Why have Phillips gas sales leveled off after growing so spectacularly for many years?" This results from several reasons, including the following: (1) During the past five or six years we have somewhat curtailed domestic exploration for and development of gas reserves and diverted these funds largely to foreign exploration; and (2) we have sold

1-07

certain developed gas leases prior to their making contributions to income. Therefore, normal declines in deliverable volumes under some of our earlier gas sales contracts have not been compensated for by new deliveries.

This leads to the second question, "Why have we made these sales of developed gas properties?"

We have made these sales for these reasons: (1) They do not further our exposure to Federal regulation; (2) the income from the properties is taxed on a capital gains basis rather than as ordinary income; (3) they make the proceeds available earlier for reinvestment in new earnings projects; (4) they minimize the hazards of long-term, regulated firm price contracts in face of inflationary trends; and (5) they remove any uncertainty over possible future reduction in percentage depletion.

Since such lease sales are classified as sale of capital assets, income from them has not been a part of gas operating revenue. These sales of gas reserves do not mean that we are selling off our gas properties and going out of the gas business. They simply mean that we shall favor making similar such sales of reserves we may find or develop in the future if they meet the proper tests of profitability.

A third question is, "Why are Phillips so-called 'in-place' sales different from certain widely publicized and discussed 'in-place' sales made by others?"

was just placed in operation. When fully completed in early 1964, the entire line will link our Sweeny Refinery with new northeastern marketing areas and with terminals en route in our southeastern and mid-Atlantic marketing regions. We have seven completed terminals along the line in these latter two regions and are constructing two more. We have also either built or are constructing a number of terminals to serve our growing northeastern markets. One of these, at a site recently purchased, will be in the New York City harbor area.

As the largest producer-marketer of liquefied petroleum gas, Phillips has large storage for this product during the summer to supply peak winter demands. Part of this storage is at the point of production and part on pipelines at the terminal point of distribution.

A unique example of point-of-production storage is a 160,000 barrel "frozen earth" facility to store retrigerated propane which we began operating last month at our Woods Cross, Utah, Refinery. Although refrigerated storage of propane at atmospheric pressure is not new, this is the first frozen-earth storage container for refrigerated propane on a commercial scale in the U. S. Phillips holds two U. S. patents covering major features of the installation.

At point of distribution we have recently completed a huge aboveground refrigerated propane storage tank of 500,000 barrels capacity

These other sales have been to interstate pipeline companies, and since these pipeline companies obviously intend to transport and sell the gas from the properties in interstate commerce, the Federal Power Commission has ruled that it has jurisdiction over such property sales. We foresaw some years ago that such "in-place" sales to interstate pipeline companies might result in the FPC asserting jurisdiction over such sales and have refrained from making them in recent years.

Our sales have been simply the sale of developed gas properties by one operator to another. The purchasing operators have, it is true, entered into conventional gas sales contracts with interstate pipeline companies; however, there is no reason to assume that the Federal Power Commission will have or assert jurisdiction over the prior sale of developed properties from one producer to another.

Moreover, instead of receiving a down payment plus about 20 annual installments in amounts approximating receipts under a conventional gas sales contract with a pipeline company, our revenue has been in the form of a down payment plus two or three long-term notes.

A fourth question is, "What is the present regulatory status of Phillips gas business?"

In 1959, the Federal Power Commission, in a rate decision which involved Phillips prices for gas sold in interstate commerce

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at the East St. Louis terminal. It will provide the St. Louis distributor with winter supplies of make-up gas.

LP-gases, always versatile materials, continue to spread into new market uses, and Phillips is alert to promoting such uses for its products and developing the essential equipment to do so.

There is a little known but significant relationship in our business between LP-gas and ammonia sales. Sales of LP-gas peak during the fall and winter and decline during the spring and summer, whereas ammonia sales have just the opposite curve. Phillips has taken advantage of these seasonal ditterences in demand to effect substantial economies by using the same tank car and truck equipment to transport both products. This is feasible because as liquefied gases both are held under similar pressure conditions.

The magnitude of savings in transportation and storage costs we can realize by utilizing the same equipment, during the different seasons for the two products, is indicated by the fact that we presently own or lease about 4,000 railroad tank cars used interchangeably for the transportation of both products.

SALES

Phillips 66 products have been introduced to motorists in the Northeast since we were last here three years ago. Some 60 jobbers in the northeastern region now are selling Phillips 66 products through more than 860 retail outlets.

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Certain intervenors have requested a rehearing of this case and a decision by the Supreme Court on this is expected soon. If the rehearing is denied this particular rate case will be closed. The granting of such rehearing or even a reversal by the court of its decision would not set any new gas rates, but merely require the Federal Power Commission to reconsider its actions and to eventually come out with a new decision.

The fifth question is, "What is the future for Phillips domestic gas business?" Gas demand will continue to grow. Although most of the really huge gas fields in accessible, shallow formations in this country probably have been discovered we believe that there are still good reserves available in deeper, less accessible formations. Regardless of some of the "pie in the sky" predictions of future supplies of gas in the United States, such supplies are going to be exceedingly expensive to find and develop. When the price incentive becomes sufficient and dependable enough to search for these more costly gas deposits, we will again step up our domestic gas exploration.

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1-54

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1-55

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SALES

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evolve. Although there is sufficient gas for immediate needs, new gas is not being found at anywhere near the amount necessary to fulfill predicted demands.

Various members of the FPC have publicly stated on different occasions that they are aware that adequate price incentive is necessary for them to fully do their job of protecting consumers in the matter of adequate future supplies. We feel that regardless of the method used in determining gas rates, the FPC must ultimately approve prices which will provide sufficient incentive to look for reserves necessary to provide this supply.

SUPPLY AND TRANSPORTATION

Phillips was the first company to design and operate a long-distance multi-product pipeline. Phillips has continued as an industry leader in transportation technology, and more recently in the automation of transportation and distribution facilities, bringing ever-mounting efficiency to this end of the business.

Today Phillips crude oil, natural gas liquids, and products flow through widespread supply networks which include six thousand miles of wholly owned common carrier pipelines.

Phillips is one of the nine oil companies which formed and own Colonial Pipeline Company, which is now building a huge products pipeline to run from near Houston, Texas to Linden, New Jersey, in the New York City harbor area. A 36" diameter, 1,047-mile segment of the main line from Texas to North Carolina

at the East St. Louis terminal. It will provide the St. Louis distributor with winter supplies of make-up gas.

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SALES

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Our marketing effort in this area is just getting started and the appearance of additional Phillips stations will follow as carefully developed plans are carried out.

Nearly 30% of the nation's population lives in this territory, making it a potential large-volume market for our products. Competition in the area is no stronger than in others, including the southeastern and mid-Atlantic states, where our expansion has been strikingly successful. The integrated and economical transportation and distribution system which we are building up from our plants to consuming centers in the area makes this marketing expansion a logical step. Also, we are no strangers to the Northeast. Phillips has long supplied other liquid petroleum products, synthetic rubber, carbon black, plastics, and a variety of additional chemical products to the Northeast.

Our sales volumes of petroleum products, which include motor fuel, burning oils and LP-gas, increased nearly 60% in the 10 years through 1962. During the past few years there have been severe disturbances in the U.S. petroleum products markets. In this light we have been taking positive steps to eliminate or to avoid unprofitable business. We have thus made substantial progress in upgrading the profitability of our petroleum product sales. Although this probably will result in a sales volume gain this year slightly less than that of the industry as a whole, we nevertheless estimate

an over-all increase of about 2% to approximately 482,000 barrels daily. We anticipate a considerably larger increase in 1964, and this will be business with greater profit potential than the volume of just a few years earlier.

After dropping to depressing lows during the summer of 1962, gasoline prices rose somewhat during the latter part of 1962, dropped back early in 1963, then rebounded and remained relatively stable at higher levels during the first half of this year. Since mid-year, however, recurrent weaknesses have shown up and wholesale prices for the third quarter are averaging lower than a year ago.

Phillips believes that the biggest part of the answer to the gasoline supply-price problem, as well as to the question of how our industry can increase its profitability, is to increase the total demand for gasoline. We believe that the way to get this extra margin rise in gasoline demand is to induce the American people to use their expanding amount of leisure time in going places in their automobiles.

In addition to taking steps of our own to increase car travel, we are concentrating much effort on providing service facilities tailored to customers' needs and desires at what our studies indicate to be the most profitable locations. As part of this effort we are selecting sites and steadily constructing new service stations along

interstate highways and other major transportation arteries, and in high-volume areaways such as shopping centers. Another phase is concentration on special types of stations to fulfill the particular wants of customers at particular locations, such as food or mechanical services.

To click and pay off, all of the facilities and operations which we have described require skilled and cooperative people. We believe the Phillips team is second to none in the industry. More than any other asset, these people provide Phillips great promise for the future.

Mr. Adams will now conclude our presentation.

Concluding remarks of K. S. Adams

My conclusion will be quite brief. You have heard and seen some current highlights of Phillips. Many present and immediately future profit sources have been plainly spelled out. The advantages of our widely diversified, strongly established operations should be apparent. No doubt you can now understand my confidence that Phillips is in an exceedingly strong position to increase its earnings in future years.

We greatly appreciate this opportunity to present to you this current look at Phillips.

J-51 and J-51A, Letter and Memorandum, May 1, 1964

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(ED. 4-22-71)

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EXHIBIT
U. S. DIST. COURT
S. D. OF N. Y.

J-51 & J-51A

FPI: NI—9-24-73-50M-4417

May 1, 1964

Mr. Cordell Moore, Administrator
Oil Import Administration
United States Department of the Interior
Washington 25, D. C.

Dear Mr. Moore:

As you are aware, Phillips Petroleum Company has recently proposed the establishment of a chemical manufacturing plant in Puerto Rico to meet the need for raw materials critical to the continued development of the Island. To provide the feedstock necessary for such a facility the Administrator of the Commonwealth's Economic Development Administration requested on January 14, 1964, that the Secretary of the Interior increase the maximum level of imports of unfinished oils into Puerto Rico in the amount of 50,000 barrels per day pursuant to section 2(c) of Proclamation 3279.

In order to provide the quantity of unfinished oils needed by Puerto Rico if its economic growth is not to be hampered by the mandatory program, it is our request that a recommendation be made by your office pursuant to section 14(b) of the current Oil Import Regulation that the Secretary increase the level of imports of unfinished oils for Puerto Rico in the amount of 50,000 barrels per day for the purpose of making available for allocation by the Board a quantity of unfinished oils. We are submitting hereunder a memorandum in support of the requested recommendation.

We have filed on behalf of Phillips Petroleum Company a petition with the Oil Import Appeals Board requesting an allocation in this amount for the proposed facility. The allocation requested is conditioned upon an increase in the maximum level

of imports for this purpose by the Secretary. Enclosed for your information is the brief in support of Phillips' petition to the Board including a copy of Phillips' proposal concerning the projected chemical manufacturing plant.

In the event you wish to discuss any aspect of the Phillips' project we would be pleased to confer with you.

Sincerely,

Oscar L. Chapman

Enclosures

J-51A

United States
Department of the Interior
Oil Import Administration

E 522

Memorandum in Support of Request for Recommendation
for Increase in Maximum Level of Imports
of Unfinished Oils - Puerto Rico

Introduction

On January 14, 1964, the Administrator of the Economic Development Administration of the Commonwealth of Puerto Rico (EDA) requested that the Secretary of the Interior increase the maximum level of imports of unfinished oils into Puerto Rico in the amount of 50,000 barrels per day. The EDA request, pursuant to section 2(e) of Proclamation 3279 which allows such action to meet increases "in local demand in Puerto Rico or demand for export to foreign areas," was made expressly for the purpose of providing feedstock for a chemical manufacturing plant proposed for Puerto Rico by Phillips Petroleum Company.

In subsequent correspondence to the Secretary in detailed support of the request, a copy of which is attached, the EDA Administrator noted that natural chemical and mineral resources are practically non-existent on Puerto Rico and emphasized the need in Puerto Rico for a facility such as that proposed by Phillips which would produce raw material chemicals critically needed to provide opportunities for new investment and new employment. The Administrator further noted

that the two existing refineries on Puerto Rico have not developed the chemical raw materials critically needed by the Commonwealth.

I. Authority to Increase Maximum Level

Economics and the geographical position of Puerto Rico (about a thousand miles southeast of Miami) are such as to militate against any substantial use in a petrochemical operation of petroleum produced in the United States. Based on the needs of Puerto Rico and EDA's experience to date, the two existing refineries which primarily are producers of gasoline are unable to contribute to the development of a petrochemical industry on the scale needed.

In these circumstances, the question for determination here is simply whether the mandatory program is to be a bar to the economic improvement of Puerto Rico in a substantial sector or whether the mandatory program is designed to allow consideration of the present, critical needs of the Commonwealth.

Section 14(a) of the current Oil Import Regulation establishes the maximum level of unfinished oils for import into Puerto Rico at the amount of the average barrels per day imported into Puerto Rico during July 1956. As to this, Proclamation 3279 provides in section 2(c) that the maximum level may be set at a higher level if the Secretary determines that such action is required to meet increases in local demand or demand for export to foreign areas. Conditions in Puerto

Rico are such that an urgent need exists for raw materials for the purpose of attracting basic industry and jobs. The most practical and economic source of raw materials for Puerto Rico is petroleum. There is thus a demand in Puerto Rico for the feedstock to provide such raw materials. No reason whatever exists for a narrow construction which would place the instant request outside the purview of section 2(c) of the Proclamation.

On the other hand, considerable reason exists for allowing the increase requested by Puerto Rico:

1. The Report of March 6, 1959, of the Special Committee to Investigate Crude Oil Imports recommending to the President the imposition of mandatory controls indicated that controls should cover Puerto Rico for the sole reason that otherwise the rest of the program might be rendered ineffective. The Special Committee recommended, however, that the Secretary of the Interior be allowed to increase the levels of imports to meet increases "in local or export demand." Shortly thereafter, Proclamation 3279 of March 10, 1959, contained the following finding by the President:

> Whereas I find and declare that the Commonwealth of Puerto Rico largely depends upon imported crude oil, unfinished oils, and finished products and that any system for the adjustment of imports of such commodities should permit imports into Puerto Rico adequate for the purposes of local consumption, export to foreign areas, and limited shipment of finished products to the continental United States. ...

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That imports into Puerto Rico were to be adequate for purposes of local consumption is the clear intent of the Proclamation. For this reason, as well as for the purpose of allowing exports to foreign areas, section 2(c) of the Proclamation was included. As the EDA request indicates, imports of unfinished oils are critically needed for purposes of local consumption. E 525.

2. That the mandatory program was designed to place reasonable limits on movements from Puerto Rico to the continental United States and not to restrict the economic development of Puerto Rico is also clear. Puerto Rico was not included in the voluntary oil import program initiated in July 1957 but, as seen, Puerto Rico was included in the mandatory controls for otherwise petroleum could be imported into Puerto Rico, converted into finished products, and moved to the continental United States without restriction. Concerning Puerto Rico's inclusion in the program, the Secretary of the Interior stated:

> It is my understanding that such restrictions were not placed on Puerto Rico with the view of hindering or in any way encumbering its own economic growth, but rather to place a reasonable limitation on the movement of petroleum from Puerto Rico to the Continental United States so that the "loop-hole" would, if not blocked entirely, at least be reduced in its impact. 1/

1/ Letter of Secretary Seaton to Governor Munoz, September 2, 1959, in Oil Import Administration Public Hearing File, Hearing of July 8-9, 1959, San Juan, Puerto Rico.

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Early in the life of the mandatory program it was officially proposed that limitation on movements from Puerto Rico be accomplished by quotas on such movements, leaving Puerto Rico free to import what it needed to meet the growing local demand. This approach was abandoned, however, and the present indirect method of limiting movements to the United States was retained whereby imports into Puerto Rico are limited in order to limit movements to the United States.

Whether or not the present scheme is the most sophisticated means of limiting movements into the continental United States, however, is beside the point. The point is that, as stated by the Secretary, "restrictions were not placed on Puerto Rico with the view of hindering or in any way encumbering its own economic growth."

3. A fact also to be considered for its bearing upon section 2(c) of the Proclamation is the scheme of the mandatory program with respect to the two other geographic areas. In Districts I-IV the maximum level of imports of crude oil and unfinished oils is related to production in that area.[2/] The whole aim of the program is to provide incentive for increases in production and when production increases the level of imports for Districts I-IV does likewise.

In District V, the maximum level depends upon the difference between total demand in that area, on the one hand, and production and

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2/ Sec. 3(a)(1), Proclamation 3279, as amended.

supply and overland imports on the other.[3/] As the quantity represented by the latter sources is outstripped by "total demand," the maximum level of imports rises automatically.

The maximum level of imports of crude oil and unfinished oils for Puerto Rico, however, is established at the quantity that two Puerto Rican refineries which happened to be then in operation were importing in July 1958. When it is remembered that Puerto Rico was an underdeveloped area in 1950 and that Puerto Rico's per capita income in 1952 was about 59 per cent that of the lowest state, Mississippi, it would appear that less generous provision is being made for a geographic area whose need is greatest. The only reasonable conclusion is that section 2(c) was designed to render flexibility to the Puerto Rican level of imports just as flexibility exists in the two other geographic areas.

In these circumstances, it seems clear that the Secretary is authorized to and should grant the requested increase. Were a petrochemical plant to go on stream in District V, it seems clear that the feedstock utilized would become a part of "total demand" so as to enter into the calculation to determine the maximum level of District V

3/ Sec. 2(b), Proclamation 3279, as amended.

imports. Like District V Puerto Rico is also a crude-deficit area as well as being a natural chemical - and mineral-deficit area and thus a raw materials-deficit area. There is no indication that section 2(c) was meant to be narrowly construed. Instead every reason exists for a construction of the Secretary's authority which would accomodate the critical economic requirements of Puerto Rico and at the same time maintain the effectiveness of the mandatory program.

As stated by EEA, the existing petroleum industry of the Island has not developed the chemical raw materials critically needed. Reluctance by the Secretary to increase the level of imports as requested would place two Puerto Rican refineries in a position in which they could, in large measure, determine the course of industrial development in Puerto Rico. As we think has been demonstrated, such a result was not contemplated by the framers of the mandatory program. Indeed, unless an essential program like the mandatory program can be administered with an eye to critical needs such as this there is always the danger that such a program may fall of its own weight.

II. Requested Recommendation

Phillips Petroleum Company has petitioned the Oil Import Appeals Board to grant an allocation to import 50,000 barrels per day of unfinished oils into Puerto Rico to provide feedstock for the proposed

...ore chemical facility. The request before the Board is conditioned ...on an increase by the Secretary of the maximum level of unfinished ...ils into Puerto Rico by that amount. Accordingly, it is requested that ...e Secretary be recommended to exercise his authority under section ...(c) of the Proclamation by raising the maximum level for the purpose ...of making 30,000 barrels per day of unfinished oils available to be allocated by the Board for the proposed facility.

While the Secretary is apparently not authorized to make direct allocations to persons ineligible under the Oil Import Regulation, it is submitted that the Secretary may increase the maximum level to make available for allocation by the Oil Import Appeals Board a quantity of unfinished oils for particular purposes.

Respectfully submitted,

By: /s/ Oscar L. Chapman
Oscar L. Chapman

Chapman, Friedman, Shea,
Clubb and Duff
932 Pennsylvania Building
Washington, D. C. 20004

May 1, 1964

J-52, Letter, Durand to Kelly,

June 19, 1964

COMMONWEALTH OF PUERTO RICO

ECONOMIC DEVELOPMENT ADMIN

P. O. BOX 2871

SAN JUAN, PUERTO RICO

USA 33s - 475
(ED. 4-23-71)

E 530
EXHIBIT
U. S. DIST. COURT
S. D. OF N. Y.

J-52

FPI-81—8-24-78-50M-4417

June 19, 1964

The Honorable John M. Kelly
Assistant Secretary
U.S. Department of the Interior
Washington 25, D. C.

Dear Mr. Kelly:

I appreciated the opportunity to participate in the June 18 meeting in your office for the purpose of discussing the proposed Puerto Rican project of the Phillips Petroleum Company.

We in the Economic Development Administration are of the view that the potential of the Phillips project is such as to promise a major industrial breakthrough which, we hope, will avert an impending economic crisis in Puerto Rico.

The storm warnings of a potential economic hurricane are already evident. The barometer is falling as indicated by the following facts.

1. The economic safety valve of the 1950's in the form of net migration of Puerto Ricans to the U.S. has now been closed. During the 1950's Puerto Rico's average annual net rate of population increase was a fraction of one percent. In 1963 the comparable figure was 2.1%. During the current fiscal year ending June 30 the comparable figure will probably be close to 3 percent because when the final returns are in, it is virtually certain that they will show a net inflow of Puerto Ricans from the States to the island. This will be the first time that this will have happened in the history of our development effort.

2. Expiration of existing grants of tax exemption within our present manufacturing universe is accelerating. We have already experienced recently a rising rate of plant closures. It is probable that this rate will continue to rise steadily during the years immediately ahead.

3. Puerto Rico is in process of transformation from a low wage rate into a relatively high wage rate economy. Average wage rates in manufacturing in 1955 were $0.55 per hour; in 1963 the rate was $1.14 for

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...
...UAN, PUERTO RICO

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an increase during the period of about 107%. One of our principal promotional tools of the past has been badly blunted.

Going beyond observed facts we greatly fear the immediate impact of the "Kennedy Round" of tariff negotiations on much of Puerto Rico's existing industry. I agree with your observation that over the longer term the results of these negotiations will probably strengthen the economies of both Puerto Rico and the U.S. But the coincidence of the short term impact of U.S. tariff cuts together with a population explosion, expiring tax exemption grants and rising production costs could produce in Puerto Rico a very grave economic and social crisis within the next 2-4 years.

This crisis must be avoided if humanly possible.

As I stated during our meeting I believe it to be in the best interests of the U.S. Government to do what it reasonably can to avert such a crisis. It is imperative for the Commonwealth Government to do everything which it can to avert such a crisis. I feel it is to our mutual interest to protect Puerto Rico's position as a practical example of how an underdeveloped area has dramatically expanded its economy under democracy.

Thank you again for your continued sympathetic interest and that of your associates in the Department in our problems. Because of the great importance which we attach to culmination of the Phillips project I want to repeat to you my assurance that you may count at all times, now and in the future, on the full cooperation of all of us in the Economic Development Administration.

Best regards.

Sincerely yours,

Rafael Durand
Administrator

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J-53 (A-E), Transcript of Testimony before Oil Import Administration, July 31, 1964

Return to :
STANLEY LEARNED

J534-E

E 532

OFFICIAL REPORT OF PROCEEDINGS

BEFORE THE

[redacted]

UNITED STATES DEPARTMENT OF THE INTERIOR

[redacted]

OFFICE OF OIL AND GAS

Docket No. _____

In the matter of OIL IMPORTS FROM PUERTO RICO

[redacted]

Place Washington, D. C.

Date JULY 31, 1964

Pages 1-221

MILLER COLUMBIAN REPORTING SERVICE
Official Reporter
931 G STREET, N. W. WASHINGTON 1, D. C.
METROPOLITAN 8-1405

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UNITED STATES DEPARTMENT OF THE INTERIOR
OFFICE OF OIL AND GAS

E 535

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In the Matter of: :
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OIL IMPORTS FROM PUERTO RICO :
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Interior Department Auditorium
18th and "C" Streets, N.W.
Washington, D.C.

Friday, July 31, 1964

The hearing in the matter of Oil Imports from Puerto Rico was convened on Friday, July 31, 1964, commencing at 10:00 A.M., before:

J. CORDELL MOORE, CHAIRMAN
Administrator of the
Oil Import Administration

TOM SHELDEKER,
Assistant Administrator of the
Oil Import Administration

BRUCE WRIGHT,
Mineral Resources Branch,
Solicitor's Office
Department of the Interior.

-oOo-

CHAIRMAN MOORE: According to my watch, it is now 10:00 o'clock.

This meeting will now come to order.

I should like to introduce myself. I am J. Cordell Moore, Administrator of the Oil Import Administration, Department of the Interior, Washington, D.C. On my right is Tom Snodeker, Assistant Administrator of the Oil Import Administration, and on my left is Bruce Wright of the Mineral Resources Branch of the Solicitor's Office, Department of the Interior.

This hearing was called by the Secretary of the Interior. The purpose of the hearing is stated in the notice as follows:

> "In view of representations from the economic Development Administration of the Commonwealth of Puerto Rico pointing out the unfavorable economic outlook for Puerto Rico and the stimulus to continued growth in the Commonwealth that could be provided by the establishment of a petrochemical complex in Puerto Rico, the Department has decided to hold a public hearing in order to receive comments and testimony on all phases of the mandatory oil import program relating to imports into Puerto Rico of crude oil, unfinished oils, and finished products."

We anticipate that this hearing will consume all of today and perhaps a portion of tomorrow.

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I might add here, that if you have anything as far as the Press, Mr. Wood is there, and you can hand it to Mr. Wood, who is at the end of the Press Table.

Written statements -- ten copies -- will be accepted after the conclusion of this hearing whether you have made oral comments during the course of the meeting or not. Such statements should be addressed to me at the Department of the Interior, and they will be accepted through the close of business on August 14.

There will be no time limit on oral statements during the course of this hearing, but in order to save time, I will ask you to keep your statements as concise as possible and to avoid repetition.

There have been 16 requests for time during the course of this hearing. It is our intention to take these requests in the following order; which I will announce in just a moment.

I have received, as of this moment, a statement, a written statement, from the Sun Oil Company, dated July 31, 1964, submitted by Darwin W. Ferguson, Vice-President.

It will be made a part of the record and will be included with the record, to be reviewed upstairs. Some copies of those statements are on the Press Table.

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The second speech I received was from the Embassy of Venezuela dated June 5, 1964.

I also have, for the record, a telegram from Tetro, dated July 29, 1964.

These will be made a part of the record.

Mr. Snedeker informs me that we have just received another from the Texas City Refinery Company dated July 24, 1964.

These statements will be made a part of the record, as I indicated before, and will be available for inspection.

I expect that during the morning hour, we will only have time for probably two or three, but we will hear the various witnesses in this order.

No. 1 will be the Economic Development Administration of San Juan, Puerto Rico.

Second will be the Phillips Petroleum Company, Bartlesville, Oklahoma.

Third, the Standard Oil Company of New Jersey.

The Tropical Gas Company, Miami, Florida.

The Atlantic Refining Company, Philadelphia, Pennsylvania.

The Hess Oil and Chemical Company, Perth Amboy, New Jorsey.

The Commonwealth Oil Refining Company, San Juan, Puerto Rico.

The Petroleum Company of Puerto Rico.

The Sinclair Refining Company of New York.

Globe Oil Company.

Texaco, Inc.

Gulf.

Standard Oil Company of Indiana.

Socony Mobile Company of New York.

Independent Petroleum Association of America, Washington, D.C.

Tidewater Company of Los Angeles, California.

Since this is to be an open hearing, others may testify when the parties mentioned above have finished and upon being recognized by the Chairman.

I should like at this time to call Mr. Rafael Durand. For the record, will you please state your name and position and proceed with your statement.

STATEMENT OF RAFAEL DURAND, ADMINISTRATOR
ECONOMIC DEVELOPMENT ADMINISTRATION,
COMMONWEALTH OF PUERTO RICO

Accompanied by:

AMADEO I. D. FRANCIS,
Economic Advisor

and

MR. SAM VAN HYNING.

MR. DURAND: My name is Rafael Durand. I am Administrator of the Economic Development Administration of the Commonwealth of Puerto Rico, the agency which is charged with planning and stimulating the industrial growth of Puerto Rico.

I am accompanied by Amadeo I. D. Francis and Mr. Sam Von Hyming.

I appreciate this opportunity to register my government's wholehearted endorsement of the pending application of the Phillips Petroleum Company.

It is not over-statement to assert that the Commonwealth of Puerto Rico views the proposal before you as crucial for the future economic well-being of our island. It is the result of three years of effort and negotiation in which our government sought to interest elements of the petroleum and chemical industries in establishing in Puerto Rico the core of a petrochemical complex which we deem urgently necessary to meet and conquer the economic factors converging to threaten and challenge the industrial development and social well-being of our island.

It is our firmly held conviction, moreover, that continued economic and resulting political progress and stability in Puerto Rico not only is of overriding importance to Puerto Ricans, but also to the United States as a whole, if not to the entire free world. We submit, therefore, that the application before you is fraught with considerations and implications which may far outweigh those normally involved in requests for increases in import quotas.

With your indulgence, I would like to relate the present application to the history of Puerto Rico's industriali-

zation, to its economic posture today, and to the development course which the Commonwealth must follow if it is to emerge economically and politically strong from the vise of economic factors challenging the successes of the past of which we, and we think the United States as a whole, have been justifiably proud.

We who are charged with responsibility for Puerto Rico's industrial development confidently hold to the conviction that approval of the pending application will form the basis for future pride and satisfaction in our development effort, equaling that which has been generated by our "Operation Bootstrap." We feel that you are entitled to a full exposition of the economic factors which bring us to this conclusion.

Puerto Rico's industrialization effort dates back to 1942 and has been based on two premises:

First, Puerto Rico's high rate of unemployment and the extreme poverty of a majority of its citizens were reducible primarily through the creation of scores of thousands of employment opportunities in manufacturing;

Second, to create such job opportunities bold planning and strong government initiatives were required.

Since 1950, when the agency which I administer was established, our industrialization effort has been focused on the attraction of private capital -- local, stateside, and

foreign -- to invest in manufacturing in Puerto Rico. It is the Economic Development Administration's function to stimulate, not dominate, Puerto Rican industrial growth, and a diversified, self-sustaining competitive economic system is our goal.

Puerto Rico is not affluent today; neither is it any longer a "Caribbean slum" as it was 25 years ago. Exhibit #1 shows the growth in Puerto Rico's labor and per capita real income. I would request, Mr. Chairman, that this and other charts to which I will refer, be made a part of the record of this hearing. For convenience, we have attached reproductions of the charts to copies of this testimony which we have handed the reporter. Our progress to date, it should be acknowledged, is the result not only of the rising productivity of the Puerto Rican worker but of the nature of Puerto Rico's association with the United States which has facilitated Puerto Rico's development, making possible the free movement of people, goods and capital between the island and the continent.

However, the economic advantages that Puerto Rico enjoys from its association with the United States should not obscure the benefits the United States derives from Puerto Rico's economic progress.

In 1950, Puerto Rico represented a $711 million market for U. S. goods. Exhibit #2 shows that today, at

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a direct result of the Island's development and improved economic conditions Puerto Rico is a billion dollar market for U. S. products and ranks fifth in the world as a buyer of U. S. goods. On a per capita basis, moreover, Puerto Rico is the largest purchaser of U. S. goods. It is important to point out that for every million dollars of U. S. shipments to Puerto Rico, some 130 U. S. jobs are created. This means that production for Puerto Rico generates about 130,000 direct and indirect jobs in the U. S. -- approximately the same number of new jobs as the total in Puerto Rico attributed to our industrialization effort.

Our political and economic progress is in striking contrast to what has occurred in Cuba during the past five years. Puerto Rican development is watched very closely by governments and peoples in the Caribbean, Latin America, and throughout the world. Since 1950 we have received some 27,000 students, government officials and businessmen from 137 countries who have come to the island to examine its political, social, economic and cultural programs. They have come to study meaningful economic and social progress in a developing area under a democratic society during a period in which developing areas elsewhere are torn between democracy and the enticements of Communism's traveling salesmen.

To continue the advances of the past the Commonwealth

of Puerto Rico has two basic economic objectives for the decade ahead:

First, achievement of a minimum annual family income of $2,000;

Second, a substantial reduction in the level of unemployment.

These two objectives obviously are interrelated.

A substantial reduction in the level of unemployment can be effected only if hundreds of new factories can be established in Puerto Rico. The development program must create, according to the estimate of the Commonwealth Government, 116,000 net additional manufacturing jobs over the next decade. This is half as many direct manufacturing opportunities as it has succeeded in creating since the start of Operation Bootstrap as you will observe in Exhibit #3.

As you will recall, Exhibit #1 showed that per capita income rose in real terms by an annual average of just over 5 per cent during the past decade. Our present development plan aims at doubling our 1960 per capita income by 1975 -- an effort which will require an average annual rate of increase of 4 per cent throughout the period. This, we estimate, will in turn require that net income generated by new factories must increase at an average rate of some 15 per cent annually.

E 545

The United States Government has recently proposed legislation to reduce poverty in "Appalachia." The Appalachian "benchmark" -- the goal of the program -- as I understand it, is a minimum family income of at least $3,000. Fifty per cent of Puerto Rico's families still have an annual income of less than $2,000. Exhibit #4 shows our distribution of families by income level. You will note the great progress made in the past decade. Obviously, however, we still have a long way to go. The $3,000 United States goal is far above realistic Puerto Rican prospects. Only with the greatest effort can we hope to achieve a minimum family income of $2,000. In fact, in 1962 Puerto Rican per capita income was approximately 75% lower than the United States national average, and 50% lower than the lowest per capita income state in the nation.

In our effort to achieve our minimum income goals we face at least four economic impediments with which we must reckon:

1. A work force increasing much faster than jobs.

2. Rising production costs.

3. The forthcoming Kennedy Round of tariff negotiations which will certainly have an adverse effect on the Puerto Rican economy at least over the short term.

4. And, most importantly, the critical lack of indigenous raw materials.

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Of course, the primary inescapable fact which we face is the population explosion. During the 1950's the Puerto Rican rate of population growth was one of . lowest in the world, less than one per cent annually. During the past three years it has become one of the world's highest, approaching 3 per cent annually. The reason for this dramatic increase is the rapidly falling net outward migration as shown in Exhibit #5. Net annual outward migration, as you will note, decreased from a recent high of 40,000 to a present almost negligible level.

From 1951 to 1960 the labor force actually declined from 713,000 to 625,000. But -- and this is a crucial fact -- the labor force in the past three years has increased from 625,000 to 695,000. And unemployment continues high, at over 11 per cent, which is twice the national rate.

Unless the United States changes from a labor surplus to a labor shortage area the prospects are for a continuing low level of Puerto Rican net migration or more likely a net return flow of workers to Puerto Rico. This would further accelerate the increase of the available Puerto Rican labor force for which jobs must be found.

Exhibit #6 illustrates the second factor which we confront in trying to reduce unemployment. Since 1955 average wage rates have more than doubled.

These increases can, I believe, be related to Exhibit #7 which depicts the structural changes in Puerto Rico's manufacturing sector between 1950 and 1960-- the increasing diversification of Puerto Rican industry. It is appropriate to note at this point that Puerto Rican wages in certain industrial sectors are very close to those currently being paid in several states. This is true, for example, of the apparel industry which even today, despite the industrial diversification which has been under way in Puerto Rico during the past decade, still provides 26% of our factory jobs. This is shown in Exhibiy #8. These states, it should be noted, actively seek to attract some industries for which Puerto Rico formerly held a special attraction because of its low wage rates. The red sections of Exhibit #7 compare the industrial diversification in 1950 to that of 1960. It is interesting to note that while Puerto Rico in 1960 derived only 32.8% of its net income from high wage industries, the United States obtained twice as much of its manufacturing income from the type of high-wage industry which we must attract if we are to be successful in obtaining our minimum income goals.

However, diversification, associated as it is with a rapid rate of technological change, adversely affects total employment opportunities in the short-term, thereby creating another obstacle to attainment of our family income goals.

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There is every reason to believe that the rate of job disappearances in Puerto Rico as a result of technological progress will be far greater than that in the United States because Puerto Rico has a larger percentage of current employment in agricultural and other relatively low-skilled jobs.

In this connection, at least until fairly recently, employment generated by "Operation Bootstrap" has been more than offset by substantial declines in agricultural jobs and in handicrafts such as needlework. This is illustrated in Exhibit #9. During the past decade, total economic activity in Puerto Rico, measured in real terms, increased by over 75% while the total actively employed labor force declined by 10 per cent.

To remain competitive, the quality of our new employment opportunities must continue to improve. Intimately linked as it is to the United States market, Puerto Rico cannot drift into obsolescence and ultimately sink into technological backwardness. It can readily be seen, therefore, that Puerto Rico urgently must attract new high wage industries at a faster rate than is possible under present circumstances.

We are also concerned about the possible short-term impact of the "Kennedy Round" of tariff negotiations on much of Puerto Rico's industry. We estimate that two-fifths of the shipments of our existing plants are of high-tariff

items. While we believe that over the longer term the results of these negotiations probably will strengthen the economies of both Puerto Rico and the United States, the coincidence of the short-term impact of the tariff cuts together with a population explosion and rising production costs could seriously hamper Puerto Rico's efforts to improve its social and economic well-being.

Finally, one of the most important obstacles to industrial development and to the realization of our income goals is the almost total lack of natural resources. If one were to eliminate those aspects of the Puerto Rican scene which generate tourism (weather, scenery, protected beaches and fishing grounds) an inventory of her natural resource base could be briefly listed. The known resources include limited and low-yield copper and iron ores, silica sands, limestone, kaolin clays, and a relatively small amount of arable land. On this last point, it is relevant to note that nearly 48% of Puerto Rico's land has been classified as "severely eroded"; over 22% has been classified as "moderately to slightly eroded"; less than 15% of the land has suffered no apparent erosion.

The trend in net income from our small amount of arable land is shown in Exhibit #10. Such increase in net agricultural income as has taken place in recent years has been due to increased livestock production. With a total land area of fewer than 3,500 square miles, on which [illegible]

the expansion prospects even in livestock production are limited.

Each of these factors in itself would confront our continuing development effort with a serious challenge. Their convergence at this juncture in our history, however, demands imaginative, bold steps in order to effect a major breakthrough that will permit Puerto Rico to accelerate its development pace. If this acceleration does not take place, and soon, serious economic and social difficulties will shortly emerge.

In anticipation of the obstacles which we now face, we decided several years ago that greater emphasis in the new phase must be placed on industrial core facilities and on technologically-advanced industries: specialized metal working; specialized communications equipment; data processing; basic chemicals production. On this last we have, during the past three years, discussed with several oil companies the possibility of building a petrochemicals-oriented core facility in Puerto Rico. Only Phillips has responded to the extent which we regard as meeting our urgent requirements.

The Phillips proposal provides an ideal opportunity for effective United States-Puerto Rican cooperation. Basic to our endorsement of the Phillips project is the promise it holds for increasing both the quality and the quantity of new employment opportunities in Puerto Rico. The quality of the

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manufacturing employment opportunities which Phillips project would generate is of very high order.

First, the jobs directly generated would be "permanent" because the capital investment per worker would be such as to require a long-term commitment on the part of Phillips to Puerto Rico. This is in contract to the commitment of so-called "light" industry which predominates in Puerto Rico today. As economic conditions change such firms can readily dismantle their machinery and equipment and relocate.

Second, the proposal would provide employment predominately for men. Our light industry has to date for the most part provided job opportunities for women.

Third, the direct jobs which the Phillips project would generate would create relatively high-wage employment, considerably higher than the current level obtaining in manufacturi

Our experience to date has indicated that on the average a single new manufacturing job opportunity will generate more than two new jobs in construction and commerce combined. In the case of the well-paid permanent employment opportunities which the Phillips project would open up the ratio would certainly be higher.

The fundamental aspect of the Phillips project is that it would make possible an industrialization effort in a direction which otherwise would be denied Puerto Rico because

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of its paucity of nature's gifts. It was specifically in recognition of the absence of known deposits of oil and gas that Presidential Proclamation #3279 found our petroleum industry to be dependent on the importation of crude and unfinished oils.

It may be well at this point to note the historical development and present status of our efforts to develop a petroleum and petro-chemical industry. At the outset, some ten years ago, we thought only of processing petroleum in Puerto Rico for power and automobile fuel. Later, without natural resources of our own, we explored world sources of raw materials and concluded that the most versatile, economical and practical source of chemicals and minerals was petroleum, whose derivatives could replace other natural chemicals. It was clear to us that the progressive processing of these materials could employ thousands of persons directly and support additional thousands indirectly and in industries attracted by the availability of raw materials such as nylon, polyethylene and other synthetics.

We are aware of existing and prospective petrochemical and refining ventures in Puerto Rico and we feel that the Phillips' proposal offers the best answer to the needs of Puerto Rico as we see them.

We appreciate that your evaluation of the Phillips project and its prospective substantial benefits to Puerto

Rico must be in the context of the national security objectives of the United States Oil Import Control Program. I cannot appropriately speak directly to this question except to suggest that rising income levels and economic stability in Puerto Rico should make a positive contribution to United States national security. It is vital to the United States for Puerto Rico to continue to demonstrate that a free democratic society can exist and prosper in a developing area of key importance to America's national security objectives.

It should be stated for the record that in endorsing the Phillips project, we have insisted that the company accept in writing certain commitments as a pre-condition for our endorsement of the release by the Interior Department of any oil import quota. The most important of these commitments are the following:

1. Phillips has agreed to utilize profits from the core chemical plant to insure the construction of satellite plants;
2. Phillips has agreed to invest profits in joint-venture operations downstream of the core chemical plant:
3. Phillips has agreed to offer to manufacturers located or willing to locate in Puerto Rico the right of first refusal on chemicals produced by the core chemical plant.

Fulfillment of these commitments is expected to generate several hundred millions of dollars of new investment and consequently tens of thousands of new employment opportunities in manufacturing. We have a clear understanding with Phillips regarding steps which are available to the Commonwealth Government if these commitments are not fulfilled.

These steps include withdrawal of support for the company's import allocation and suspension of tax benefits.

It is our considered conclusion, Mr.Chairman, that approval of the present application is urgent and necessary and that favorable action will provide important evidence of our joint purpose. We respectfully commend it favorably to you.

I wish to suggest three additional improvements in the operation of the mandatory oil import program as it relates to Puerto Rico. The first of these I regard as essential; the other two I believe to be desirable.

The essential improvement concerns the fact that under the existing Proclamation a transfer of ownership of a company holding an import ticket automatically results in the transfer of the import ticket to new management. I believe continuation of this situation would be imprudent. The reason for this belief is that new management would be under no obligation to honor any commitments made to the Commonwealth Government by previous management. I therefore propose that the Secretary

of Interior be authorized to review the proposed transfer of any Puerto Rican crude oil import ticket.

My second proposed improvement is concerned with the so-called "export incentive" plan. The broad background of this plan is that the Commonwealth Government wishes to do everything it practicably can to assist in reducing the U. S. balance of payments deficit. We believe that such assistance should be in the form of export expansion, not import reduction.

If they had an incentive to do so we believe that Puerto Rican refining companies could develop substantial amounts of export business. No such incentive now exists because of the present automatic quota-sharing provision of the Proclamation. We recommend elimination of this provision. Our suggested substitution would be a provision whereby each company making export sales would be eligible for a barrel-for-barrel quota increase in relation to the volume of such sales.

My third suggested improvement relates to the fact that the first sales of foreign jet fuel at San Juan International Airport were made in August 1963. These sales of foreign jet fuel followed an April 1963 finding by the U. S. Customs Bureau that such sales would be legal under the existing Proclamation. We respectfully suggest that this "loophole" in the Proclamation be closed.

Thank you.

CHAIRMAN MOORE: Thank you very much, Mr. Durand.

MEMBER OF AUDIENCE: I have a question.

CHAIRMAN MOORE: I am not at this moment permitting questions from the floor. I may get to that, later.

Mr. Durand, I would like to ask you a few questions, here. You mentioned here that you were losing light industries.

Have you any statistics in here? I did not notice them on this rate, in which you say you were losing light industries.

MR. DURAND: I do not have it at hand, the specific material. I can submit it later. I can tell you this is an item referring to the light, marginal industry, which has been losing advantage, both in the United States and Puerto Rico and that any changes -- economic changes -- such as a recess in the course of production; wage rates; tariff readjustment could, rather easily, wipe out a good number of those light industries.

CHAIRMAN MOORE: To what do you attribute the loss of these industries?

MR. DURAND: There are several factors.

The first one I would like to refer to is the cost of production trend. The costs of production have been increasing in Puerto Rico at a substantial rate.

Wages back in 1951 were 55 cents. The average wage

increased to almost $1.20 at present, $1.18 in 1964. This is a very important factor of production for light industry -- for any industry but for light industry, it is fundamentally decisive.

Also, many of the industries that have located in Puerto Rico have enjoyed tax exemption. These tax grants have been inspiring in the last few years. Now, some 200 of the new plants are already subject to taxation. They terminated their tax grants. This is a factor.

The first tarrier barrier -- the adjustments -- will be a very influential determining factor in the future of industry in Puerto Rico. This, like industry, will be seriously affected by tariff barrier changes.

These are the main factors.

CHAIRMAN MOORE: If anyone has any questions from the floor if they want to present them to the Chairman, he will then consider whether or not they can, appropriately, be asked.

If you want to do that, there is a pad here.

Wylie, if anyone has any question, take the pad out, and let them write it on here, will you please?

You have indicated that you are investigating the possibility of attracting to Puerto Rico, high wage and labor factor industries. Is that correct?

MR. DURAND: Yes, sir.

CHAIRMAN MOORE: Of which the petro-chemical industry is one.

To what extent have you investigated other possibilities?

MR. DURAND: We have been placing a lot of efforts in attracting metal industries to Puerto Rico. Metal Industries. Thus far, although we have made some progress; I can mention for example, Ford Motors plant. They have just recently been promoted for Puerto Rico. We still have not been able to attract a substantial number of firms that will help us tackle this problem.

Electronics is another field.

They are also working on the development of a scientific community too, in an effort to develop highly technological processes in Puerto Rico but still, we have such a long way to go that it is not enough.

CHAIRMAN MOORE: I gather that you have investigated the possibilities -- or other firms have indicated an interest in the petro-chemical field have they?

I believe we have had one here from at least one of the companies. You have investigated these other proposals?

MR. DURAND: There have been several proposals and we have investigated each one of them.

CHAIRMAN MOORE: You have considered them in the same light that you have the Phillips proposal. Is that correct?

MR. DURAND: Yes, sir. Yes, sir.

CHAIRMAN MOORE: In this connection, as long as you are here, you did not bring this in specifically, but I do have something that I would like to mention.

Fertilizer was one of the items that I had discussed at some time with the numerous people here. Do any of the plants on the Island currently make fertilizer?

MR. DURAND: There is a nitrogen plant.

CHAIRMAN MOORE: Right. Do they make enough to supply the requirements of the Island?

MR. DURAND: Yes.

CHAIRMAN MOORE: They do?

MR. DURAND: Yes.

CHAIRMAN MOORE: Do they have any expansion plans?

MR. DURAND: I would say they have an expansion plan. They had the opposite. They have been facing troubles too many years, and it is very risky to venture a prognosis but they are expanding in the future.

CHAIRMAN MOORE: Are there any other petro chemical plants in Puerto Rico at the present time?

MR. DURAND: Yes. I refer to the Commonwealth Oil; Carribbean Oil. The question is?

CHAIRMAN MOORE: Petro-chemical plants.

MR. DURAND: Oh, petro-chemical. No. Union Carbide.

CHAIRMAN MOORE: What type of a plantdo they have?

Are you prepared to answer that question?

That is a trade zone operation, is it not?

MR. VAN HYNING: Pardon?

CHAIRMAN MOORE: That is a trade zone operation, is it not? Union Carbide? That is a trade zone operation, is it not?

MR. VAN HYNING: That is correct. The trade zone, I believe, became effective about two years ago. The Carbide plant, as I recall, came on stream in mid-1959 -- about five years ago. There were certain difficulties in its feed stock supply. It was originally contemplated that feed stock for the plant would come from the Commonwealth Oil Plant, and for physical reasons, as I understand it, that did not prove out.

I believe Mr. Snedeker played an active role in the matter of processing the trade zone application, which has been in operation, I think, as I said, about two years.

CHAIRMAN MOORE: How many jobs do you think, Mr. Durand, would be made available in Puerto Rico if this petro-chemical complex were established?

MR. DURAND: We don't have a specific estimate, but we could supply that.

CHAIRMAN MOORE: Is the Union Carbide, to your knowledge, planning any further expansion at this moment?

MR. DURAND: Not to our knowledge.

CHAIRMAN MOORE: Not to your knowledge.

Is Commonwealth planning any expansion?

MR. DURAND: They have announced expansion plans.

CHAIRMAN MOORE: In their expansion along the lines of refining or petro-chemical feed stocks?

MR. DURAND: They have announced it in the line of petro-chemicals.

CHAIRMAN MOORE: We will leave the rest of that. I see Commonwealth is on the witness list, so we will leave that until later.

I believe there will be no further questions.

Thank you very much, Mr. Durand.

I see we have Mr. Stanley Learned of the Phillips Petroleum Company.

STATEMENT OF STANLEY LEARNED
President and Chief Executive Officer
Phillips Petroleum Company

MR. LEARNED: Mr. Chairman, my name is Stanley Learned, and I am President and Chief Executive Officer of Phillips Petroleum Company, Bartlesville, Oklahoma. For nine years before being elected President in 1962, I was Chairman of the Executive Committee and Assistant to the President. I have been employed by Phillips since 1924.

On behalf of Phillips, Mr. Chairman, let me state our appreciation for the endorsement which Mr. Durand, on behalf of the Commonwealth of Puerto Rico, has given to our project in his testimony. For this whole-hearted support, we are most grateful.

On December 16, 1963, Phillips Petroleum Company made a formal proposal to the Economic Development Administration of the Commonwealth of Puerto Rico, already referred to by Mr. Durand, to build a core chemical facility in Puerto Rico as a basis for establishment of satellite manufacturing plants producing intermediate chemical and consumer goods. Our proposal requires the importation into Puerto Rico of 50,000 barrels per day of selected hydrocarbon feedstocks. Our purpose today is to present to you our plans and capabilities for executing this project, outline certain economic benefits to Puerto Rico which would result from carrying out our proposal, and ask your affirmative action on our request for importing into Puerto Rico the necessary 50,000 barrels per day of hydrocarbons.

Mr. Durand has just presented extensive background on Puerto Rico's economic situation and has detailed the extensive and penetrating analysis made by this administration which points to the needs of Puerto Rico for a chemical complex of the character proposed by Phillips. As well, he has indicated his Government's desire to see our proposal brought into being.

Phillips Petroleum Company constantly has under study the development of ways of making best economic use of its raw materials. In recent years, with the development of more and more hydrocarbon resources overseas, we have accelerated such studies.

Last year we made studies of the economic feasibility

of separating crude oil near the point of production in North Africa into two products, namely, a high boiling fraction and a low boiling fraction. Our concept was to transport the high boiling fraction to Europe, then refine and market it there, where the demand for distillates and residual fuel oil is great, and then use the gasoline materials to the extent feasible as feedstock for manufacturing petrochemicals, at the best location for such petrochemical plants.

This concept was under serious consideration when the guide lines developed by Puerto Rico's Economic Development Administration, relative to the establishment of a core chemical industry, came to our attention. Consultations with that agency indicated that our own interests fit these same guide lines remarkably well. This led to our preparation of the proposal which was submitted to the Economic Development Administration on December 16, 1963.

Before proceeding further let me say that the recently announced 100,000 barrels per day refinery to be built in England by Phillips Petroleum Company and Imperial Chemical Industries Limited, will utilize much of the crude oil now available from Phillips concessions in North Africa. Therefore, the feedstock for the Puerto Rican petrochemical complex will come from one or more of the following sources:

1. Direct purchases of low boiling fractions from refiners in the Carribean area.

2. Direct purchases of low boiling fractions from refiners in other parts of the world.

3. Phillips sources in North Africa, Venezuela or other parts of the world.

We were aware that Puerto Rican officials had considered other proposals for petrochemical projects during the past several years and were dissatisfied with them because of problems of marketing the large refinery yields of distillates and heavy fuel oil which would have been produced under such proposals. This objectionable feature is eliminated in our proposal.

In brief, the proposal, which will be described more fully by our next witness, Mr.Roy Waldky, is initially to build facilities in Puerto Rico for production of Aromatics, cyclohexane and paraffinic fractions. These are building blocks for a variety of end products, including synthetic fibers, plastics, and fertilizers. Between the core facilities of our initial phase of the venture and the end product manufacturing plants, we envision, in addition, a number of plants to make intermediate feedstocks. Thus each primary petrochemical produced by the core industry would serve as a beginning of a chain of manufacturing operations ultimately producing consumer goods. More than half of the 90,000 barrels per day of hydrocarbons to be imported into Puerto Rico would be converted directly into petrochemical feedstocks and into fuel necessary for production of such feedstocks.

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Ultimately, as a by-product of the operations of the core chemical plant, 24,000 barrels per day of motor fuel will be produced. Phillips has for some time been progressively expanding its petroleum products markets in the United States, most recently extending its marketing territory to the north-eastern states. The motor fuel produced in Puerto Rico would be largely used to satisfy our expanding markets on the East Coast. We expect also to become a gasoline marketer in the Commonwealth.

We are advised by EDA that Puerto Rico's primary need for establishment of industry is to provide gainful employment for large numbers of its people. Establishment of a core chemical industry is a first step in satisfying this need. Construction of numerous satellite plants around the core chemical industry is required to achieve maximum employment. Such satellite plants can be developed only if an economically attractive situation exists for each plant. This requires that each intermediate feedstock must be produced in sufficient volume to supply a subsequent consumer product plant which can compete in world markets. Therefore the core industry must be established on a large scale, requiring a large volume of basic feedstock.

Such a scale of establishment of a core industry and the addition of satellite industries will require massive investments of risk capital. A long-term supply of low-cost

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feedstock is vital to securing such capital.

The feedstock for the petrochemical complex must be such that the processing steps can minimize the production of refined by-products such as motor fuel and produce no distillates and heavier fuel oils.

The importance of such a project to the economy of Puerto Rico requires that every possible precaution must be taken to insure the success of the plan before it is initiated. Therefore, thecompany which undertakes the establishment of the project must have demonstrated outstanding capability in research, engineering, manufacturing, finance, and marketing. Moreover, successful experience in developing similar large petrochemical projects from the laboratory, through plant operation, to consumer acceptance of the end products would be a great advantage.

The sponsoring company mustalso evidence acceptance of a long-range growth commitment in Puerto Rico. The company must be willing to forego short term realization of profits in the form of dividends and expect to use cash generated in initial years of operation to provide additional manufacturing facilities.

Mr. Chairman, fulfillment of Puerto Rican needs as expressed by EDA depends upon a combination of resources which I think Phillips uniquely possesses. This combination includes:

1. The ability to supply the selected hydrocarbon fractions which are suitable for the chemical manufacturing contemplated, rather than a supply of crude oil as such.

2. A large research and development organization of very wide scope which has proved outstanding in its development of petrochemical products and processes and is broadly staffed and equipped to continue both basic and applied research and development work in the fields embraced by our proposed project.

3. Proven technical knowledge and experience in petrochemical manufacture which can be devoted completely to the success of the project.

4. A petrochemical marketing organization which is competent to assist in establishing markets for all products in excess of Puerto Rican internal requirements, in addition to helping to establish consumer products ventures and marketing within Puerto Rico.

Mr. W. W. Keeler, Chairman of the Executive Committee of our Company, will testify later in more detail concerning our research and our qualifications as a petrochemical developer, manufacturer, and marketer.

Experience heretofore indicates that an expanding chain of consumer goods ventures will develop in Puerto Rico to use steadily increasing percentages of the raw materials production, provide greatly increasing employment, and add

substantially to the Commonwealth's economic growth.

Later testimony will demonstrate a potential investment, deriving from the processing of 50,000 barrels per day of hydrocarbons in core facilities, of $597,000,000 and a potential direct employment in the core and satellite plants of over 30,000 people. When employment related to community support of such plants is considered, a much larger total employment figure for Puerto Rico is indicated. Moreover, the types of jobs needed for development and operation of the plants and other facilities resulting from the core operation would be of a quality which would substantially upgrade the employment opportunities in Puerto Rico.

Obviously, a project of this tremendous potential cannot mushroom into being overnight. It must be built upon a financially sound step-wise approach such as that indicated here. Our confidence that this project is the most satisfactory answer that can be developed to Puerto Rican needs for a chemical industry, and of the project's economic success, is indicated by our commitment obligating Phillips to invest $100,000,000 toward realization of its potential.

Obviously, a $100,000,000 commitment requires a company with sufficient experience and resources to enable it to commit such a sum and to plow back earnings from original investment into supporting ventures.

Mr. Chairman, this is in a general way, the project which Phillips proposes for Puerto Rico. If I may be allowed, Mr. Chairman, I would like to step aside for the time being for three other witnesses from Phillips, who will each discuss a particular aspect of the project in detail. At the end of their testimony, I would request permission to address myself very briefly to one or two closing points.

CHAIRMAN MOORE. I think we will continue on and ask questions at the conclusion of the testimony of all of you.

All right.

STATEMENT OF ROY M. WALDBY, MANAGER
PETROLEUM PROJECTS DEVELOPMENT,
PHILLIPS PETROLEUM COMPANY

MR. WALDBY: Mr. Chairman, my name is Roy Waldby and I am Manager of Petroleum Projects Development for Phillips Petroleum Company. I have been associated with the Company since graduation from Oklahoma State University in 1937 with a degree in chemical engineering. During my twenty-seven years with the Company I have been engaged in manufacturing operations. Most recently I served as a Superintendent of the Sweeny, Texas manufacturing complex. My present responsibilities as Manager of Projects Development include planning and development of refineries and petrochemical plants outside the continental United States.

From the outset of our talks with the Economic Development Administration of the Commonwealth of Puerto Rico Phillips Petroleum Company has never considered crude oil as a satis-

factory feedstock for a core chemical industry. Kerosene, diesel fuel, heating oil and residual fuel oil yields from crude oil would be excessive. By the use of selected hydrocarbon fractions in the motor fuel boiling range, Puerto Rico's objectives can be reached. Such hydrocarbon fractions containing high percentages of the lower boiling naphthenes may be derived from crude oil and from natural gas liquids which are available to Phillips Petroleum Company through its world-wide operation and/or by purchase or trade with others.

I wish to emphasize the following points concerning the supply of feedstock for the core chemical industry in Puerto Rico:

1. Phillips Petroleum Company does not propose or seek to bring crude oil into Puerto Rico as feedstock for chemical production.

2. Phillips proposes to bring into Puerto Rico 50,000 barrels per day of material boiling in the gasoline range and especially suitable for petrochemical manufacturing.

3. If Phillips brought in crude oil to make the same chemicals proposed it would be necessary to import between 150,000 barrels per day and 200,000 barrels per day of crude oil instead of 50,000 barrels per day of material in the gasoline boiling range.

The core chemical industry which Phillips proposes to install and operate in Puerto Rico is described schematically

in Phillips Exhibit 1 entitled "Petrochemical Industry for Puerto Rico Proposed Initial Petrochemical Operations." Mr. Chairman, permission is hereby requested that this exhibit be made a part of the record.

CHAIRMAN MOORE: Permission is granted. It will be included as part of the record.

MR. WALDIE: Examination of Phillips Exhibit 1 reveals that processing of 50,000 barrels per day of feedstock would be carried out in the following types of manufacturing operations: hydrode sulfurization, fractionation, catalytic reforming, solvent extraction, fractional crystallization, dealkylation and hydrogenation. Yields from these initial manufacturing facilities are paraffinic fractions - 8,000 barrels per day, cyclohexane - 33 million gallons per year, benzene - 30 million gallons per year, ethyl benzene - 62 million pounds per year, orthoxylene - 68 million pounds per year, paraxylene - 49 million pounds per year and motor fuel, 4[illegible] barrels per day.

Phillips Petroleum Company proposes to start construction of these facilities immediately upon being granted a quota for import of 50,000 barrels per day of unfinished oils in Puerto Rico. Immediate investment in these initial facilities will be $45 million. It is anticipated that 800 to 900 workers will be employed during approximately 15 months of field construction of these facilities. Construction of facilities associated with

processing units described above will include docks, submarine lines, power plant, shops, warehouses, offices, laboratory facilities and tankage.

Our scientists and engineers have explored potential uses of the products from the core facility in plants for carrying out primary chemical processing, secondary chemical processing and production of consumer goods. Such study was necessary both that Phillips might determine the most advantageous means of reinvesting profits generated by the core facility and that the Economic Development Administration might be advised of the investment and manpower requirement potential of such manufacturing.

Phillips Exhibit 2 outlines these additional processing steps. Permission is requested, Mr. Chairman, that Phillips Exhibit 2 be made a part of the record.

CHAIRMAN MOORE. It will be included as part of the record.

MR. WALDBY: It may be observed in that section entitled "Primary Chemical Processing" that from the paraffinic fraction of 5,000 barrels per day are derived: ammonia, ethylene, butadiene, and carbon black. Adipic acid and hexamethylenediamine are produced from cyclohexane. Styrene is produced from naturally-occurring ethyl benzene and from ethyl benzene produced by the alkylation of benzene with ethylene. Phthalic anhydride is produced from orthoxylene. Terephthalic acid

monomer is produced from paraxylene. E 573

That section of the chart entitled 'Secondary Chemical Processing' shows the production of urea from ammonia, polyethylene from ethylene, rubber from butadiene and styrene, carbon black from the carbon black feed, nylon 66 resin from the adipic acid and hexamethylenediamene, polystyrene resin from styrene and polyester resin from terephthalic acid monomer.

That section of the flow diagram entitled "Consumer Products Processing" shows fabrication of polyethylene to yield pipe, film, bottles, housewares, etc. Rubber tire manufacture utilizing the rubber and carbon black produced in an earlier stage is shown. Spinning and weaving operations utilizing nylon 66 resin and polyester resin are indicated for production of nylon 66 fabric and polyester fabric. Plastic fabrication of polystyrene resin to produce housewares, moldings, forms, and other items, is indicated.

Phillips Exhibit 3 entitled "Puerto Rico Petrochemical Complex Estimated Investment and Manpower Requirements" presents data on investment and manpower associated with the above-described manufacturing operations. Mr. Chairman, we request permission to make Exhibit 3 part of the record.

CHAIRMAN MOORE: It will be included as a part of the record.

MR. WALDBY: As regards investment, it may be observed that core chemical complex investment is $45 million, a total

for primary chemical processing units is $90.8 million, a total for secondary chemical processing units is $96.3 million, and a total for consumer product units is $363.6 million, for an over-all potential investment of $597.7 million.

As regards manpower requirementsfor direct employment, the core complex is operated by 400 employees, primary chemical processing units by 610 employees, secondary chemical processing units by 1,845 employees, and consumer products units by 30,400 employees, to give an over-all potential direct employment of 33,255 employees. After a consideration of the ratio used by the Economic Development Administration for community support of two support people for each direct employee, it may be observed that the total potential of this project is to give employment to almost 100,000 residents of Puerto Rico.

While the chart, Phillips Exhibit 2, which we have been discussing shows three stages of processing downstream of [illegible] fact there may be contemporaneous construction of plants in stage one and stage two, and for that matter certain plants [illegible] in stage three may be constructed contemporaneously with the core plant. Consideration will certainly be given to construction of certain plants for production of consumer goods, utilizing raw materials produced outside of Puerto Rico, in order to build sufficient markets to justify construction

of plants in Puerto Rico for production of such raw materials. It is noteworthy that since information concerning the Phillips project became public, inquiries have been received by Phillips from firms manufacturing chemicals and consumer goods, relating to possible establishment of plants as a part of the contemplated petrochemical complex.

Phillips Exhibit 4 is entitled "Projected Schedule of Financial Operations in Puerto Rico" and it is requested, Mr. Chairman, that Exhibit 4 be made a part of the record.

CHAIRMAN MOORE: It will be included as part of the record.

MR. WALDEN: This table forecasts that a total of $100 million will be invested by Phillips Petroleum Company within nine years from the start of construction of core facilities and within seven years from the start of operation. It may be observed that no cash generated by the project is available for dividends until the ninth year from start of construction of the project, because it is anticipated that all of the profits will be reinvested in satellite plants.

Examination of Exhibit 4 in more detail shows that the first line "Years After Project Approval" provides column headings for financial operations set out below. On the line entitled "Core Complex" it may be observed that the forecast operating rate as per cent of capacity, is 50% for the third year after project approval, 75% the fourth year, 90% the fifth year and 100% thereafter. The next line

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forecasts a similar schedule of operation for primary chemical processes which start up six years after project approval. The line "Investment Added" shows a total of $45 million added in the first two years after project approval for construction of the core complex. Additional investment totaling $26.6 million is shown added in the fourth and fifth years for construction of ammonia, urea, and phthalic anhydride plants. A total of $26.4 million is shown invested in the eighth and ninth years after project approval for facilities to be chosen at a later date. The line "investment at Year-End" shows total investment increasing to $100 million in the ninth year after project approval. The line "Working Capital Added" shows amount and timing for addition of working capital. The line "Working Capital at Year-End" shows a total of $24.7 million employed in the ninth year. The line "Total Capital at Year-End" shows a steady increase to a total of $124.7 million a year at nine. The next line shows pre-start-up and start-up expenses, cash flow before interest, and income taxes, interest charges, cash used for loan repayment and cash reinvested. It may be noted that the next line "Cash to Tax and Dividends" shows that not until the ninth year after project approval is cash available for payment of taxes and dividends. The next lines show new loans required, outstanding loans at years end and equity capital. Exhibit 4 is intended to reflect the rate at which cash flow may be generated for reinvestment rather

than to indicate the precise type of investment. As a result such possibilities as contemporaneous construction of plants, joint ventures and reverse integration have not been covered in the exhibit.

Mr. Chairman, Phillips next witness will discuss the market research studies which have been made concerning the project.

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CHAIRMAN MOORE: You may proceed, Mr.Kron.

STATEMENT OF CARL M. KRON
MARKETING RESEARCH
PHILLIPS PETROLEUM COMPANY

MR. KRON: Mr. Chairman, my name is Carl M. Kron. I have been an employee of Phillips Petroleum Company for the past 16 years. Upon graduation from the University of Kansas with a B.S.degree in chemical engineering, I joined the Research and Development Department of Phillips. I spent 11 years as liaison engineer to Phillips many petrochemical plants. My most recent experience has been in the field of marketing research in the Chemical Department. Currently, I am manager of marketing research for elastomers, fertilizers and miscellaneous chemicals.

Phillips has a long-standing, demonstrated capability to sell in the United States and international marketplace a wide variety of chemicals derived from petroleum feedstocks. The choice of chemical products for the proposed Puerto Rican complex was based on our past ability to market certain petrochemicals and on marketing research studies to identify new growth opportunities in the fields of basic chemicals, intermediate,and consumer products. Our economic analyses indicate that the products we selected can be made available at volume and pricing levels to attract the installation of satellite plants.

Phillips Exhibit 5 is entitled "Marketing Research

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Data for Selected Products from Proposed Puerto Rican Complex." Permission is requested, Mr. Chairman, that this exhibit be made a part of the record.

CHAIRMAN MOORE: Permission granted.

(Document previously marked Phillips Exhibit No. 5 was received in evidence.)

MR. KNOX: Exhibit 5 summarizes our marketing research data and, additionally, it describes Phillips current capacity and sales position for certain petrochemicals which will be produced in the proposed Puerto Rican complex. It is important to point out Phillips established position to market representative products not only in the core complex but also in the previously identified areas of primary and secondary processing and consumer products fabrication.

The following discussion describes the existing and projected situation for marketing each of the proposed products from Puerto Rico.

The 8,000 barrels a day of paraffinic fraction will be committed initially to captive operations outside Puerto Rico and, of course, outside the continental United States. There are both transportation disadvantages and advantages involved in exporting the paraffinic fraction. Transportation costs cause an economic penalty for this product in world markets. However, using a vessel to haul the paraffinic

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fractions plus petrochemical products will reduce transportation and storage costs of the latter and thus improve their economic position. Tentative plans call for an early conversion of the paraffinic fraction into intermediate chemicals in Puerto Rico.

The current and projected strength of cyclohexane markets reflects the growing demand for nylon-66 and nylon-6. The world market for nylons promises to expand steadily at an annual rate exceeding 10 per cent. Nylon production consumes about 90 per cent of the cyclohexane produced. Substantial new markets for cyclohexane may develop in areas short of phenol, another nylon feedstock. As shown in Exhibit 5, Phillips already has a dominant position in supplying cyclohexane. The cyclohexane-producing capacity chosen for Puerto Rico is somewhat less than the near-term expected annual growth increment in the Free World. Phillips marketing contracts reveal that the proposed volume of cyclohexane could be contracted for 1966 and future consumption in the export market, if our commitment is made in the next six months.

In line with cyclohexane prospects, benzene price has definitely stabilized since early 1964. Because a slight overcapacity in benzene exists, the proposed Puerto Rican benzene capacity was intentionally held at a very modest level. This level is equivalent to Phillips projected captive and contractual export requirements.

E 581

Ethyl benzene consumption is tied directly to styrene usage which should grow at a rate of eight per cent a year. Because of the relatively small volume of this product involved in the core complex, because of the captive requirement for most of the proposed production, and because of keen interest in the United States in new sources for this product, United States consumption of the ethyl benzene can be expected from the core unit. Expansion of the ethyl benzene facilities should be considered as one of the first satellite units.

For the next two years, the United States faces a substantial overcapacity for orthoxylene, because of installations in progress in Europe. The depressed price for naphthalene, an alternate feedstock for phtalic anhydride production, should continue to set the value for orthoxylene during this period. However, phthalic anhydride continues to be a growth candidate, and orthoxylene promises to be the feedstock used for production of new phthalic anhydride. Thus, the outlook for orthoxylene is expected to improve. However, if this does not materialize by 1966, alternate processing routes will be available in the core complex to convert the orthoxylene to products readily marketable. Phillips recent entry into the plasticizer-consumer field opens some captive market for orthoxylene derivatives.

The increasing demand for polyethylene terephthalate

fibers and films will sustain an eight per cent annual growth rate for paraxylene. Paraxylene pricing is marked by weakness today, with world-wide prices decreasing but expected to stabilize next year. The new price level will dictate paraxylene plant size on the order of that shown in the proposal for economical future operation. Phillips has been competing successfully with a much smaller capacity unit, which just recently was sold to another company. Based on active inquiries concerning paraxylene requirements, United States consumption of all paraxylene from the core complex is expected.

On the whole, each of the primary, secondary, or consumer products made from the core complex products, just described, will be treated separately in this testimony. It is understood that with a material such as urea fertilizer each increment of urea marketed would reduce incrementally the supply of its attendant feedstocks, namely, ammonia and paraffinic fraction, which would otherwise be marketed.

Phillips has long been a leader in marketing anhydrous ammonia. The growth prospects for ammonia continue to look excellent with a Free World annual growth rate of nine per cent predicted. With the availability to Phillips of a large LPG tanker, ammonia shipments into world markets will be in a strong competitive position from a Puerto Rican location.

E 583

As a leading marketer of butadiene, the second product listed in the primary processing section, Phillips has also demonstrated its sales ability. The growth prospects for butadiene are not as bright as those for other chemicals in the proposal. Therefore, the proposed butadiene output was held to a modest level to meet projected synthetic rubber requirements.

Adipic acid, a precursor of nylon-66, will share in the bright growth expected of the synthetic fiber industry. Adipic is produced almost entirely by the nylon-66 producers and thus is largely in a captive situation. Therefore, although it is shown separately in Exhibit 5, it can be considered an integral part of a nylon operation.

Styrene growth will probably be eight per cent annually over the next few years. Projected demand exceeds considerably current capacity. Styrene rubbers will be displaced somewhat by polybutadiene rubbers but polystyrene plastic usage will support styrene's near term growth. Based on marketing studies, most of the proposed styrene production will be destined for the export market.

Phthalic anhydride prices were under heavy pressure during the past year. Changing technology with the advent of orthoxylene as a starting material in place of napthalene was certainly a major factor. Installed capacity figures are not too meaningful because of the very strong possibility

that many old plants are becoming obsolete. Growth rate for phthalic will probably be six per cent a year. Obsolescence would dictate installation of new phthalic plants at a still higher rate. Because of Phillips captive requirement for some phthalic derivatives, Phillips strong position in the field of plastics and the attractive growth prospects for economically priced product, the market situation for Puerto Rican phthalic looks reasonably favorable.

In keeping with the proposed intention of forward integration of the core complex, paraxylene processing could lead a satellite operation into the fast-growing field of polyester fiber and film. Correspondingly, two intermediates might be produced for sale. These are terephthalic acid and dimethyl terephthalate. High purity terephthalic acid is the one expected to have the brighter future, based on our marketing research studies.

Among the proposed products from the secondary processing units, urea is a strong growth contender. World-wide consumption of nitrogen fertilizers will probably double over the next ten years. Urea's share of the nitrogen fertilizer market is expected to increase from 6 to 12 per cent of the total consumption. The destination of Puerto Rican urea will be the U.S. and the numerous underdeveloped areas in the world. Phillips recently strengthened its position as a fertilizer supplier by becoming a major marketer for urea.

Phillips strength in innovating and marketing polyethylene resins is very well-known. Polyethylenes, as shown in Exhibit 3, represent the strongest growth potential of any product listed. Puerto Rican-based production of polyethylene resins would be in a strong competitive position relative to production from the many Gulf Coast plants.

Because of the moderate growth expected from synthetic rubber a relatively small synthetic rubber plant is envisioned. Phillips is an established, independent supplier of synthetic rubber in the United States.

Similarly, Phillips is a leading supplier of carbon black to the world rubber industry. The proposed carbon black operation for Puerto Rico was sized to complement the above rubber plant.

Nylon consumption will probably grow at an annual rate of ten per cent over the next few years. Although U.S. capacity appears to be sufficient over the period to meet domestic demand, continued expansion of nylon facilities should occur abroad. Phillips has over 15 years experience of supplying feedstocks to the nylon industry. These contacts will be helpful in developing satellite possibilities of producing nylon salt in Puerto Rico.

Polystyrene usage world-wide should grow at a healthy annual rate of nine per cent. Good possibilities will continue to exist for sale of polystyrene in Europe

and Japan.

E 586

Direct polyester flake marketing is not considered practical at this time because of stringent shipping procedures required. Thus, a polyester flake unit should be an integral part of a polyester fiber or film plant. Of course, overall, polyester flake has the among growth prospects of its product which is growing at a rate of nine per cent a year.

Motor fuel shipments from the area complex to the continental United States create a transportation cost advantage for those few chemical products also destined for U.S. markets. In this regard, it is planned to use vessels to carry some of the proposed chemicals and/or chemical products along with the motor fuel. This will certainly enhance the competitive advantage of these products made in the core unit or in satellite operations by other companies or Phillips.

My testimony to this point has shown that Phillips has already demonstrated its ability in marketing chemicals and chemical products.

An exhaustive analysis of the marketing aspects of the proposed consumer products has not yet been made. However, we are confident that the ensured supply of feedstocks at competitive prices and in large volumes, the tidewater location for access to United States and world markets, the

cooperative driving force of the people of Puerto Rico, and the capable commercial development people of Phillips will attract consumer products processing to the proposed core complex.

There are certain facts worth considering which bear upon the feasibility of the manufacture of consumer goods. Phillips already has experience in the marketing of plastic products and fibers. This experience involves not only independent and joint venture operations, but also experience in attracting other companies to manufacture products from Phillips feedstocks. Synthetic fibers constitute one of the dominant growth areas in the world economy. There is every reason to believe that a growth rate exceeding eight per cent per year will be maintained through 1970. Textile makers operating on the island at present will provide outlets for polyester and nylon resins or provide the basis for joint venture considerations.

Our demonstrated sales performance is effected by an energetic, capable, worldwide sales and commercial development force. It would appear to be relevant to describe the disposition of this organization. In the United States, the Phillips special products and rubber chemicals sales organization markets over 500 chemical products from seven strategically located offices. A very large staff is involved in domestic fertilizer sales from 17 offices scattered throughout

the United States. It is important to note that Phillips also has a large sales force and technical service organization specifically in the field of plastics. To handle the rapidly growing international market, Phillips sales people can be found in ten foreign locations plus the international headquarters office in New York. Additionally, Phillips has arrangements with several foreign companies to handle Phillips products. All of the aforementioned sales forces are supported by a staff of commercial development people located in the U.S. and abroad who are continually on the lookout for new chemical marketing opportunities. These activities have been directed toward further integration in the direction of consumer products.

In summary, our review of the markets for the basic chemicals from the core unit and the primary and secondary derivative chemicals shows that these materials represent an attractive growth situation yielding reasonable profits on a long term basis. Long term supply of choice low cost feedstocks, which the core complex will provide, will be a real inducement in attracting satellite industries and thus provide the basis for maximum utilization of the Puerto Rican labor force.

Mr. Chairman, this completes our review of the marketing opportunities attendant upon construction of the proposed core complex. I respectfully thank you for your

attention to this review. Our next witness is prepared to describe Phillips qualifications as a petrochemical innovator, manufacturer, and marketer.

CHAIRMAN MOORE: Thank you very much, Mr. Kron.

Let's take about a five-minute break here.

(A short recess was taken.)

CHAIRMAN MOORE: May we resume the hearing, please? If you all will resume your seats, we will resume.

Mr. Keeler, would you like to proceed, please?

STATEMENT OF W. W. KEELER

CHAIRMAN OF THE EXECUTIVE COMMITTEE

PHILLIPS PETROLEUM COMPANY

MR. KEELER: Mr. Chairman, my name is W. W. Keeler and I was elected Chairman of the Executive Committee of Phillips Petroleum Company in April 1962. I became a Vice President in the Executive Department in 1951 and have been with the Company more than 35 years.

Testimony has been presented with regard to Puerto Rico's urgent need for the project being considered today, and with regard to the policy considerations which led Phillips to make a concrete proposal to Puerto Rico. There has been a description of plant and potential, and an outline of marketing research with respect to the project. Now I would like to review the "assets" of Phillips Petroleum Company as they relate to research background, manpower, patent position,

experience with similar projects and manufacturing know-how. In other words, I wish to review our qualifications for successfully carrying out the project to its ultimate conclusion.

Most of what I will have to say here I will relate directly to the specific phases of each process, step by step, but I shall begin by giving you a brief background.

It might be helpful to know that Phillips leads the petroleum industry in at least seven aspects, namely, as a producer of natural gas liquids, as a producer-marketer of liquefied petroleum gas, in the manufacture of polyolefin plastics and of nitrogen fertilizers, and as a supplier of raw materials to the rubber industry, in the production of cyclohexane which is the principal raw material in the manufacture of nylon, and in atomic energy activities. In the petrochemical industry as a whole, Phillips is ranked among the top two or three companies. Phillips continues as one of the industry's pioneering leaders in fractionation of hydrocarbons and in research, development and the manufacture of rubber chemicals and olefin plastics.

Phillips has one of the outstanding research organizations in the petroleum and petrochemical industries. Our research reaches across the board in all significant areas related to petroleum hydrocarbons. One measure of the success of our research organization is our patent stature. For many

years Phillips, although eighth in total assets, has ranked second in the petroleum industry in the number of United States patents issued each year and in the total number of patents held. We also rank each year among the top six or eight companies in all American industry in total United States patents issued. Many of the patents deriving from our own research are the basis for our present leadership in petrochemicals.

We feel that we have one of the most outstanding employee organizations in the industry. One out of seven of our employees is a technically-trained college graduate. One of our strong points during the rapid expansion and diversification of our manufacturing and marketing activities in recent years has been our ability to furnish a group of experienced, trained men to launch projects successfully.

These qualifications are by no means restricted to our technical manpower. For example, our training group for staffing of new plant facilities includes competent, experienced operating personnel. Moreover, employees throughout the organization contribute significantly to operating improvements and results through our employee suggestion system.

In launching any project of the character of the one proposed for Puerto Rico, we can draw from our entire organization to insure that the project is thoroughly researched, planned and executed with full consideration given to every aspect; at the same time we will use the maximum [illegible]

Puerto Rican personnel, and to the rate and extent possible replace initially required Phillips personnel with Puerto Rican employees.

Now I would like to refer to the flow sheet, Phillips Exhibits 1 and 2 which Mr. Waldby has used to outline the core chemical plant and satellite manufacturing facilities to explain how Phillips qualifications relate specifically to the manufacturing operations and consumer market developments outlined in this project. Looking at feedstock volume for the core chemical plant of 50,000 barrels per day, it may be observed that this volume represents less than one-eighth of the volume of crude oil and natural gas liquids processed daily by Phillips in the United States.

Concerning hydrodesulfurization plants, Phillips now operates two such plants, one at Borger, Texas and another at Sweeney.

Phillips now operates five catalytic reforming units at locations in Kansas, Utah and Texas, and two large-scale solvent extraction units in Texas.

Through its research efforts, Phillips developed the fractional crystallization process for producing high-purity paraxylene and has licensed this process to others for the manufacture of paraxylene as well as concentration of liquids of many types.

Phillips does not operate a plant for dealkylation of

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toluene, but we hold a patent position in this field and operate several catalytic processes under similar conditions.

Phillips now operates a hydrogenation plant for the conversion of benzene to cyclohexane at the Sweeny petrochemical complex in Texas and is presently adding an additional hydrogenation unit at that same plant.

Now, we move into the stage of primary chemical processing shown on the flow chart. And here again there is a good deal of experience upon which Phillips can draw. Phillips is the nation's second largest producer of anhydrous ammonia. When current construction is completed, we will be producing more than 2,000 tons of ammonia per day at four plants located in Kennewick, Washington; Beatrice, Nebraska; and at Dumas and Houston, Texas. Three of these plants are each approximately the size of the 600 tons per day capacity plant indicated in this proposal -- the Puerto Rican proposal.

At the Sweeny petrochemical complex, Phillips operates a plant for the production of 300 million pounds per year of ethylene. Our proposal for Puerto Rico as shown indicates production of ethylene in the amount of about 160 million pounds per year.

I will pass over our experience in butadiene and carbon black for just a moment. Looking at the next item, Phillips supplies more cyclohexane than any other U.S. producer for the manufacture of nylon 66 polymer, which follows the

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adipic acid, hexamethylene diamine route of manufacture, although Phillips does not itself operate nylon plants.

Phillips has a strong position in the alkylation field. Ethylbenzene is produced by the alkylation of benzene with ethylene. At locations in Kansas and Texas, Phillips operates three of the nation's largest anhydrous hydrofluoric acid alkylation plants for the production of aviation fuel and motor fuel. We conceived, designed and operated the first commercial plant of this nature. Phillips also operates the only plant of its kind in the United States for the alkylation of isobutane with ethylene to produce diisopropyl. Additionally, we have licensed processes for the manufacturing of detergent alkylate and are constructing a Phillips-owned plant utilizing another alkylation process.

We do not engage in styrene manufacturing although we utilize approximately 50 million pounds per year in our manufacturing operations.

Plastics derived from phthalic anhydride will be used to supply captive Phillips markets in the near future. Phillips has very little experience with conversion of para-xylene to terephthalic acid. Entry into this type of manufacturing would therefore require a joint venture or license agreement.

Moving over to the secondary processing stage, Phillips currently operates one urea plant at Kinnewick, Washington,

is planning another, and widely markets urea and fertilizers containing urea.

In the field of polyethylene development, Phillips was the first American company to discover, develop and commercialize a successful process to make high-density polyethylene and related polyolefin plastics. Our research and development effort in this field continues at full scale and discoveries and improvements, both as to products and processes, continue to flow from this effort. Phillips experience with polyethylenes includes all ranges of olefins from low to high density as well as exploration in other plastic fields. Two plants in the Houston area, one operated by Phillips and one by an affiliate, are among the largest plants for the production of high and low density polyethylene. These plants have a total capacity of 272 million pounds per year.

Phillips is an acknowledged industry leader in synthetic rubber technology. We were the first to produce so-called "cold" synthetic rubber which is the backbone of the United States rubber industry today. We built and operated one of the first butadiene plants and today we license related processes around the world. Phillips was the first company to produce commercial tire-type synthetic rubber all the way from the principal raw material to the finished product. We led in development and initial production of the new cispolybutadiene rubbers. Just recently we have successfully introduced

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commercially another new family of butadiene-styrene rubbers which we trademarked "Solprene." Our research in rubber technology continues to receive very, very strong emphasis.

The capacities of our butadiene and synthetic rubber plants at Borger are 224 million pounds per year and 200 million pounds per year respectively. This 200 million pounds per year synthetic rubber production compares to the 60 million pounds per year production projected in Puerto Rico, as shown on our chart.

With reference next to carbon black, Phillips was the first company to produce commercially from oil a furnace carbon black for use in tire-type rubber. We later developed new types of oil blacks which contributed significantly to today's successful use of synthetic rubber. We operate the Free World's largest carbon black plant at Borger and one additional carbon black plant at Orange, Texas. World-wide, we have joint-venture carbon black plants in five countries and although relatively new, most of these plants have undergone or are undergoing expansion at this time to meet demands. These plants all use our "Philblack" process which is, in addition, licensed to several other carbon black producers throughout the world.

Phillips does not own or operate plants for the manufacture of nylon polymer, polystyrene or polyester polymer.

Finally, but obviously of great importance, the chart

deals with consumer products. Phillips accompanied the initial development of its polyolefin plastic manufacturing with the building of a very extensive sales service laboratory, which is located in Bartlesville to investigate and develop applications of plastics to consumer goods and to assist the numerous plastic fabricators, who are customers for our raw materials, with the development of their products. This work, and our extensive market research, has led us into numerous full and joint-venture interests to fabricate wide varieties of plastic products for the ultimate consumer market. Currently these interests include more than 25 full or part-interest plants producing plastic end products or products incorporating plastics. Without attempting to cover the entire range, they include production of fibers, pipe, numerous kinds of packaging, film, rope, bottles, housewares, beverage crates and coated papers. We have a strong technical position, for example, in development of resins for and in manufacturing of plastic pipe. Our "Pakster" beverage crate has been adopted by several leading beverage manufacturers including the world's largest and this development is undergoing quite a rapid growth. Also currently, about some half a dozen additional plastic fabricating plants which we own solely or partly are under construction both in this country and abroad, including one which extends our interest into polyvinyl chloride plastics.

Several of the plants of our affiliated companies

carry on fiber spinning operations.

While we do not manufacture rubber tires, our extensive rubber technology research has necessarily included much work involving the use of rubber chemicals in tires and the actual fabrication of the tires themselves. Phillips presently markets in excess of one million tires per year through service station outlets.

Mr. Chairman, we think Phillips is well qualified to assist Puerto Rico in the development of the petrochemical industry.

At this point, Mr. Chairman, we would like to show some photographs of some of the plants, processes and the goods manufactured at facilities operated by Phillips as well as joint-ventures in which we participate and a few slides of consumer goods made from plastics we produce.

(The following is a transcript of the commentary made during the projection of slides across the screen, but which was not a part of the witness' prepared statement:)

MR. KEELER: All right, if somebody will cut off the lights, we'll get the show on the road. There are no dancing girls.

This slide, of course, is self-explanatory, but it does illustrate the position that we were describing with regard to our position on total assets but yet how we stand and patents on as of the end of 1961, which U.S. oil companies and also for all U.S. industrial concerns.

Now, we are going to take a look at Phillips largest operation in the field of fractionation. In fact, this is the world's largest collection of fractionating columns for the handling -- a continuous handling of a wide variety of various solvents, special hydrocarbons, chemical feedstocks and motor fuel components. We are presently producing some 450 special high purity chemicals, many of which start in their manufacture in this particular operation. This is located at Borger, Texas.

Now, we are going to jump down to the Gulf Coast, and here we see an aerial photograph of the world's second largest concentration of fractionating facilities to handle the lighter hydrocarbons. This is adjacent to our Sweeney Refinery. You see in the picture, on the back row, you see plants for the production of ethylene. The 500 million pounds per year production of ethylene is not used entirely by Phillips. Many of it goes to plants in the Gulf Coast area, close to the

Sweeney Refinery, and we were just checking and found that as of this morning there are over 25 industries operated by other companies which are dependent on the production of ethylene from this plant. I think this illustrates the very point that we are trying to get at, that once you have low cost raw material it is very easy to induce people to come in and locate satellite plants.

If any of you have ever visited in Japan, you certainly know that the Japanese industry, petrochemical industry has been just that. It starts with the raw material and from that there have been literally hundreds of satellite operations. The Japanese have carried this to a great extreme. We see no reason why a similar series of satellite operations couldn't be carried on as we have indicated here.

Now, in addition to the operations I have just mentioned, we have new propylene concentration facilities for preparing the raw material for a polypropane plant in which Phillips is involved. We have also cyclohexane towers here at this point. We have a unit here for making high purity benzene and additional fractionating equipment here in the middle.

Incidentally, that plant was located at Sweeney, Texas.

Now, we are going to jump up -- you see the channel here in the background, and at this location we have a polyolefin plant for making linear polyolefin which goes out under

our tradename Marbon. We have an ammonia plant here, back at this point we have a methylvinylpiridine plant. (This is the material that is useful as a dye material in connection with the dyeing of various ones of the synthetic fibers. And then back here we have the large ammonium sulphate plant.

Now, we are going to jump up to the Panhandle of Texas, and looking at this tall prilling tower of ammonium nitrate plant. This plant has a capacity of 450 tons per day.

Look on the inside of the plant, we see an example of the very thing we talk about if you have a core complex for petrochemicals how you can use materials in various ways.

Starting from the same raw hydrocarbons we are producing ammonium nitrate which is shown coming out and going into these heavy-duty plastic bags. Those heavy-duty plastic bags are also produced from polyolefins.

Now, we are going to Borger, Texas, also in the Texas Panhandle, and we are looking at an aerial view here of our butadiene plant. This plant is using butane as a charge-stock that comes from the big fractionating setup that I showed you in an earlier slide.

The butadiene is produced here from butane and goes over to this plant here which is a copolymer unit for making synthetic rubber from butadiene and styrene. In order to meet the manufacturing requirements of the various tire companies and other fabricators of rubber products it is necessary in

many instances to incorporate carbon black. From the standpoint we bring carbon black from this plant. It is added to the synthetic rubber and shipped out without the necessity of the ultimate fabricator having to supply the carbon black and add it separately.

Incidentally, this carbon black is also produced from a high aromatic oil that is produced at the refinery, just off the slide up here to the left.

Now, we mentioned that we were already operating in various international areas. This happens to be a part interest plant located at Ravenna, Italy. The carbon black plant in this case is one that -- one of the ones that I mentioned that while they are very new they are already in the process of expanding to meet requirements.

Now, just in mentioning the activity of working in the foreign area, I would like to say that Phillips has over many years acted as a consultant to many of the foreign governments in connection with petrochemical projects and in connection with other refining problems or various other problems relating to the oil industry. But moreso, we have had the strong position and the belief policy-wise that it's highly important that the operation use the people within the area. And, from that standpoint, we feel that we have done a very good job in bringing people here from all over the world to train in our operation and then help them get started and they are able to carry

on the operation very successfully. We see no reason why we can't develop substantial technical knowledge with many of the Puerto Rican people who we will be hoping will be manning the various plants we have talked about today.

Now, I mentioned that we make plastic pipe. I doubt if it is generally recognized that we have various subsidiary companies in plastic pipe -- and this is plastic pipe. This happens to be linear polyethylene here that we are looking at. We also make PVC pipe and ABS pipe. There are a lot of experimental pipes going in various other new polymers that are being tried. They have really been put on the market commercially. But we have the largest capacity of any company for making plastic pipe.

Now, what we are seeing here shows one of the advantages of the plastic pipe. The ditch has already been dug, of course, by a ditcher, but here this six-inch plastic pipe is going to be used on a gas carrying system. And two men here with this little contraption, which is driven by a little motor, about the same size as the one used on a lawnmower and it generates heat, it heats a plate and the two ends of the unjointed pipe are brought together, heated and then pulled tight and you have a joint that's just as strong as the parent plastic. And from that standpoint, I think it would be quite obvious that there are some real unique advantages in the plastic pipe field and I think we're going to see a lot more application

because in this case these two men can get that pipe in the ditch where normally you would have to use a caterpillar, where normally you would have to have a pipe-coating machine, a pipe-wrapping machine and, of course, you would have a big welding crew wheel before you even got to that point.

So we think this has lots of application. Where you are in an area where you have corrosion and where it's possible to carry on irrigation and use of water, gas at relatively moderate prices, we think that this field is going to see a very great extensive development and we hope that this will be probably one of the early end-fabrication plants that would be installed in Puerto Rico.

In this front row, we are seeing some of these--and they have it also on that lift-truck--we are seeing some of the new plastic coke cases. And in this case we are also looking at, in the background, some of the wooden cases, and the real advantage is, of course, that the coloring and printing is right in the plastic. It stays with the plastic. It can go right through the sterilizer with all the bottles. It does not pick up a lot of moisture like wood and is considerably lighter and it is really quite a development in the soft drink field. And just, for example, as another example, this is another application that I am sure could be one of the applications going into that area.

Now, here again, I want to point out that in this

complex that we are talking about, Phillips is not making an effort to try to say that we are going to have all of these operations. It has been our policy in the past, and it's going to continue and certainly it is our intention in this case to try to encourage small business and encourage other large companies with knowhow, companies with other ideas and schemes to take advantage of the type of materials that will be available in this core complex.

Now, I always get a little mixed up at this point because of this young lady here, a charming young lady, incidentally, happens to be the daughter of one of our recently retired employees, but what she has there, she is holding some film and you see some plastic bags here, some refrigerator containers and so forth, which are one of those units at our plants companies that we told you are in the process of developing the polyolefin markets in, for instance, purchase [illegible] company, called the Joan Mehl Company, which makes all these various items and sell them under the tradename Sea-Safe, and they have very wide application all over the United States. Now that particular company has plants centrally located; has a plant on the West Coast and we are needing one very badly on the East Coast. Here is another case where I am sure we have a built-in possibility to take care of present expansion of Eastern markets.

This gentleman here is just throwing off this tugboat a polypropolene rope. Now Phillips has been in polypropolene

rope business, polyethylene rope, monofilaments for fishing nets, for other monofilament fiber uses like the materials used for outdoor furniture and, of course, one big advantage of this type of material for this service is that the rope will not soak up water like the usual hemp rope, or manilla rope. It is very light weight. He throws that out and it floats on the surface, it never sinks, so you don't have to worry if you miss the thing you're throwing at, you see.

Now the other point, of course, is that the rope has another unique advantage in that it is -- its strength is comparable to a conventional type of manilla rope, or hemp rope. It is of 1 1/2 larger diameter. In other words, this rope -- this small rope is still strong and it lasts indefinitely. It is tough and it takes a lot of scuffing, lot of work, and we are seeing particular that where they start with this equipment now they are adding this.

We are also in the bottle-blowing business, making various types of plastic bottles, but this is another example of where all of the various container companies in this country we work with and you see many of the products here from various container companies that have developed their own particular style of plastic bottles for some particular use. Now, most of the bottles, plastic bottles up to date have been used largely in the liquid detergents field and in the bleach field, and lately now they are going into items like for outboard motor oil, and

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going into -- now there's the plastic oil containers, for regular service station. But, this is another example of the use if you have the materials that it's possible to come out with satellite operations with these type of articles.

We should get another tremendous big market, not only the U.S. but the whole world, in the process of this population explosion and from that standpoint there is always a demand for toys. And the newer developments are most excellent for toys. It's just impossible, all the beating they take now in the new polyolefin toys to break them. Now, there are many plastics in the past that have represented a problem to the person that sold them, to the person that made them, but in the newer material, they just are almost unbreakable. You just can't hardly do anything to them. And it is a big market and here again is one that might be applicable in Puerto Rico.

Among the various uses of polyethylene we find one of the big uses and certainly very close to Puerto Rico are a number of plants on the Southern Coast of the U.S. that make paper and they coat that paper with polyethylene. Now this light film, the polyethylene that coats the paper, of course, not only adds to its attractiveness but it also does -- it is moistureproof and scratchproof. This happens to be in one of the plants that coats 100 per cent, ~~A. T.~~ H P. Smith Paper Company.

For many years it has been felt that the possibilities of plastics in seating would be -- here we see an example up

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in Illinois, these seats here, the backs and seat portion both of plastic. Of course, they employ other hardware -- metals -- but they are plastic. The colors, of course, are right in the plastic. The wear and scuff-proof of these materials are far above the present type of seating that goes into outdoor locations. They can stand the weather, and we think that we are going to see a considerable increase in this business.

We see no reason why this wouldn't have application as a possible satellite plant fabrication unit in Puerto Rico.

This is one that from a total poundage standpoint that doesn't really run up into too high a figure, but it is one that nevertheless shows the wide diversity of application of the polyolefins. These are covers for the nose of missiles for protection. These are put on by the various fabricators in connection with the shipment of missiles to take them to another point to do testing of missiles.

This young lady is holding a new film that has been developed by the Alamo Polymer Corporation. That happens to be a 50-per cent Phillips venture. It's a three-ply -- it doesn't look it, it looks like a single film, but it's a three-ply film in which polyethylene is on the outside, both sides with polypropolene film in the middle. Now this particular film is gaining widespread attention and use in the bread industry and for things like bacon, candy, for various types of application because it costs about 20 per cent less than cellophane,

and it is much stronger than cellophane, and it is an excellent moisture and odor barrier so that it retains what the people producing the material want to keep in and also keep out what shouldn't get into the material. This is another possibility for application in Puerto Rico.

Now, when you talk about the plastic business and the resin business, and we have mentioned the possibilities of nylon and acrylan and polyester fibers, polypropolene fibers or polyethylene fibers and so forth. It's a field that is very rapidly coming to the fore. The growth is tremendous. There is just no doubt in our minds that the world of tomorrow holds a larger use of synthetic fiber clothing. From this standpoint we have done a tremendous amount of research. We have interest in companies -- ~~and this~~ in the field of clothing, blankets and the field of fabrics for upholsteries, for drapes or anything of that sort -- in the fabric field, is just starting.

Here we have the, I'd say one of the newest applications that we've gotten into; still another plastic. We own about 40 per cent in American Renolite Company, which produces all types of polyvinyl chloride, sheet and film for applications such as we see here. Everything from shoes, to material to upholster, use in automobiles -- just a wide application.

I don't know whether any of you have been up to the World's Fair, but you will also find up there in part of our world of tomorrow many of these materials that you might guess

would be mahogany or walnut or something else, but actually it is polyvinylchloride. Now here are two panels of this material. And here again is tremendous significance in this petrochemical complex that we are talking about, because these materials can generally be produced cheaper and when it comes to rot and mildew and warping and ability to withstand the weather, they have it over the natural materials.

Thank you very much, gentlemen, for your attention and with the permission of the Chairman, I would like to ask that we include as Phillips Exhibit 6 copies of these slides that I have just presented to you.

CHAIRMAN MOORE: Thank you, Mr. Keeler.

(The slides referred to were marked Phillips Exhibit No. 6 for identification and received in evidence.)

CHAIRMAN MOORE: Mr. proceed, Mr. Learned.

CONCLUDING STATEMENT OF

MR. STANLEY LEARNED

MR. LEARNED: Mr. Chairman, the foregoing testimony has set forth operational details of the project we propose for Puerto Rico. We have also indicated confidence in our ability to produce and market products of the proposed petrochemical industry. Now, as Mr. Durand has stated, Phillips has made several commitments to Puerto Rico and I would like to get them out at this time.

First, Phillips Petroleum Company will invest a minimum of $45,000,000 providing a core chemical facility capable of processing 50,000 barrels a day of unfinished oils to yield intermediate products as described in previous testimony.

Second, Phillips will utilize all profits from operation of the core chemical facility until an additional sum of $55,000,000 is invested by Phillips for construction of satellite plants deriving feedstock from the core chemical facility. If at the end of ten operating years sufficient profits have not been generated to provide the additional sum of $55,000,000, Phillips will invest $5,000,000 a year each year after the tenth operating year until the total of $55,000,000 has been realized.

Third, Phillips will offer to invest a substantial portion of the above-mentioned $55,000,000 in joint-ventures where Phillips interest is in the range of 25-51 per cent ownership. This has the effect of drawing in additional large sums of outside capital.

Fourth, Phillips will offer to Puerto Rican manufacturers the right of first refusal, at competitive prices, for any and all volumes of product yielded from the core chemical facility which otherwise would be sold outside of Puerto Rico.

And, fifth, we will use our best efforts, in cooperation with the Economic Development Administration, to induce

chemical companies, with which Phillips is associated world-wide, to build satellite plants in Puerto Rico until such time as all petrochemicals produced by the core facility have been converted to consumer goods in Puerto Rico.

This proposal, as stated above, includes a commitment to re-invest cash realized from operation of the initial core facilities. The timing and nature of the second stage of plant investment necessarily will depend upon continuing market surveys and upon the profitability of the first stage. Studies at present indicate that this second-step construction would begin within three years of start-up of the initial facilities and include the construction of ammonia and urea plants. Further market surveys taking into account rapid developments typical of the petrochemical industry and of its consumer end products, as well as profitability, will determine the timing and nature of subsequent steps. But, as we said earlier, it is quite possible that there may be contemporaneous construction of plants in different stages and even construction contemporaneous with the core plant.

It is expected that the core chemical industry will use a corporate form in which Puerto Rican capital will be offered participation.

During the first stages of manufacturing feedstocks in the core facilities it will be necessary to market most of the basic petrochemicals outside of Puerto Rico. Phillips, as

of this moment, has markets available for over 80 per cent of the petrochemical feedstocks which would be produced at full operation.

Phillips Petroleum Company is prepared to begin immediately to carry out the initial phase of this project, consisting of the core chemical facility, as soon as we receive approval from the Department of the Interior to import the necessary 50,000 barrels per day of selected hydrocarbons. But I think I should point out to you that there will be no immediate use of such import quota, for once approval is granted for import of feedstock, the engineering, design and construction of the core chemical facilities will require one and one-half to two years. During this period, of course, no feedstock will be imported. During the first year of operation of the core plant an import rate of 25,000 barrels per day is forecast, with this rate increasing to the maximum of 50,000 barrels per day not later than six years after project approval. At all times motor fuel volume marketed in Puerto Rico and in the United States will represent less than one-half of the feedstock imported. This means that starting after two years after project approval we will market around 12,400 barrels per day of motor fuel, and that this volume will gradually increase to a maximum of 24,000 barrels per day not later than six years after project approval.

Mr. Chairman, I want to thank you and the other

officials for your attention to a somewhat lengthy presentation. I wish to conclude by respectfully requesting approval of our proposal for a petrochemical industry in Puerto Rico.

CHAIRMAN MOORE: Thank you very much, Mr. Learned. I have a few questions I would like to ask.

If anyone has any questions they think are appropriate we will pass among you a sheet. If anyone has any questions you want to put on the sheet, hold your hand up, please.

I have question here: Do I understand, Mr. Learned, you anticipate this core complex will not be ready to receive the feedstock for 1 1/2 to 2 years? Is that correct?

MR. LEARNED: That is right.

CHAIRMAN MOORE: And as you expand, gradually, the whole 50,000 barrels you are requesting somewhere under six years?

MR. LEARNED: That's correct.

CHAIRMAN MOORE: Now, with respect to employment, over what period would you assume that this 30400 additional to be employed in Puerto Rico would develop?

MR. LEARNED: That is a hard question to answer with any specifics because it is going to depend on the speed of the development of the steps beyond the core complex. But we have seen, Mr. Keeler referred very specifically to it when he was talking through the slides, we have seen developed in Japan developments of satellite plants with employment even greater

than we are developing with this project in the matter of, I would say, less than 10 years. And I can't help but believe that with ingenuity of the EDA and the Commonwealth of Puerto Rico, and with what little help we can give in Phillips, that we can anticipate over the course of 10 or 15 years we should be able to develop employment in the range of what was predicted by our staff.

MR. KEELER: I would like to go from Japan to the U.S. and say, while this is unauthorized, it is not a plug for the company particularly, but I think it is very interesting to know that one of the ~~fourth~~ great chemical companies of this country in the years from 1953 to 1963 went from 19,000 employees up to 38,000 employees. Now, they did that, what all they did during that interval, of course, I am not able to break down from the information that's available to me, but I do know from my contacts and association with the Chemstrand Company, one of their principal chemical developments, that there was quite extensive increase in the fiber field in manpower and I can tell you that some of the companies that have been interest in talking further after the announcement of this, are companie that have demonstrated substantial increase in this area, in this sort of situation.

CHAIRMAN MOORE: Thank you, Mr. Keeler.

With reference to your -- to the location or destination of the products which will be produced in the plant, we

know 24,800 barrels a day ultimately of gasoline will come into the States. Have you made any study to determine if any part of this 24,800 would eventually be further broken down into processing plants and would not actually come into the United States? I believe your chart shows right on through to the end.

MR LEARNED: Yes, we have made a lot of study and knowing that would probably be one of the points that would attract many of these people out in the audience, we very carefully went into it from all angles and, I would say, for the foreseeable future on the basis of present economics in the petrochemical business and the present petroleum refining business and marketing of petroleum products, we doubt that there would be serious likelihood in the foreseeable future to reduce that further.

CHAIRMAN MOORE: Now, with respect to petrochemical products, what percentage of those do you think initially would be utilized in Puerto Rico?

MR LEARNED: That is going to depend on whether we can build contemporaneously any of these second and third stage steps. We have had some inquiries which have led us to almost predict to you we would be doing some of that initially, but I would want to say the only way I could positively testify to you at this time is that our intention that it would be marketed outside of Puerto Rico at this time because we have no

specific proposal to give you on some of the second and third stage steps; but we are working with people and it is quite possible that we will have some of those done by the time we finish the core complex. I would have to refer, for instance, to ammonia -- I would love to have had some ammonia production, ammonium sulphate production in Puerto Rico this year so we could have exported that material rather than the material that we had to export from Sweeney, Texas or the complex that Mr. Keeler showed you and had available that material for American markets which were very short of ammonia production.

CHAIRMAN MOORE: With respect to the items , would you guess what percentage would be imported into the United States and what percentage would be exported to other countries?

MR. LEARNED: One reason we show the starting, the smaller step at 25,000 barrels of production the first year is that we anticipate we will be able largely to market this material from the core complex outside of the United States and if I had to draw a general conclusion, I would say 75 to 85 percent of it would definitely go out; and the increase in the markets I think will allow us to continue that kind of percentage.

CHAIRMAN MOORE: Your testimony indicates that the principal potential for employment will be found in consumer products. Is Phillips undertaking an analysis of marketing aspects of the proposed consumer products?

MR. LEARNED: Will you restate that question?

CHAIRMAN MOORE: Your testimony indicated the principal potential for employment could be found in consumer products, is Phillips undertaking an analysis of the marketing aspects?

MR. LEARNED: We have been actively engaged over the last three years in studies with many companies and on possible projects of our own to try to take care and meet the demands for markets where we already have commitments. In connection with this program that I mentioned, three-year program, studies, we have also talked to various outside companies and have made studies on our own of what steps might be taken in order to develop the consumer item products that you are asking about. And they are at the stage where we are not prepared to tell you the name of the company. We don't believe we could give you competitive advantage to that extent, but we can tell you we are pretty far advanced in our studies.

CHAIRMAN MOORE: Thank you.

Have you considered trademill operations, just as a matter of curiosity?

MR. KEELER: I would have to say no because I do not believe we can establish the type of project you are talking about in Puerto Rico. On an economic basis, it was done in the trade zone.

CHAIRMAN MOORE: In the testimony, I have forgotten who gave this, it may have been in your initial testimony,

you indicated that the feedstocks would be obtained from several different sources -- I believe that was Mr. Waldby.

MR. LEARNED: That was in my initial testimony. When we first made this application to Puerto Rico on December 16, 1963, we definitely anticipated we were going to be using North African crude. As I explained in my initial testimony, we have completed in the meantime, much quicker than we were able to complete the arrangements in reference to North Africa and Puerto Rico. We completed the arrangement in England for the refinery there so that our supplies in North Africa are materially taken care of. So I would have to say to you that we have not completed the procurement of materials because if you go out on the open market, you have got to say you have a firm and positive program, but the reason I have concluded the three sources and pretty much in that order because I think it will probably come from some of each from my general judgment. I do not know what the markets will be at the time we make our request, but if the markets are satisfactory, certainly if we purchase any raw materials, which I anticipate we will do, these select hydrocarbon feedstocks, we would prefer to select them from the place that has the shortest transportation in Puerto Rico and we can do it on an equal basis. At the same time, if we have additional raw materials of our own on an even basis we are going to give preference to them.

CHAIRMAN MOORE: This paraffin -- the off-take --

what do you intend to do with that? Mr. Waldby may have to answer.

MR. WALDBY: As stated in Mr. Kron's testimony on market research, we intend as soon as possible to find economic venture, such as ammonia manufacture and olefin manufacture in order that we can convert that material in Puerto Rico. Initially, we intend to market the material in captive markets in Europe, but the material is at a decided trade disadvantage and we look for it to be economic soon to manufacture chemicals from that material in the way of ammonia going on to urea and olefins at an early date.

CHAIRMAN MOORE: I notice there is nothing anywhere in your presentation indicating you intend to export that into the United States?

MR. WALDBY: We have said specifically that we did not intend to import it into the United States.

CHAIRMAN MOORE: Thank you.

How much plant fuel, barrels per day, do you have any idea?

MR. WALDBY: We convert to fuel gas to butane and lighter approximately 24 liquid volume per cent, or about 12,000 barrels a day of material to fuel.

MR. KRON: May I comment to that? There are a number of petrochemical building blocks in that gas stream. We have not included them in the analysis of this report, but I can assum

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you if at any time we find an available market in Puerto Rico where we can convert those into petrochemicals with reference to selling them as gas at a profit, that will be done. It will also add to the size of the labor force we anticipate. We simply haven't had time to get all the engineering done to cover everything.

CHAIRMAN MOORE: I realize that is true.

MR. KRON: There is one other point, we have understood that the present refining complexes in Puerto Rico are exporting from Puerto Rico some fuel. Now, on that assumption, we have hoped that it would be advantageous to both companies in a case of that sort as we are able to develop uses for some of these materials that have been mentioned, for instance, in the United States, butane is a substantial petrochemical building block of Phillips in many of its operations. And we would hope that the butane, for instance, could be used in some of these programs and call on the other refining complexes that are already on the island to supply fuel requirements.

CHAIRMAN MOORE: Going back to the plant fuel, how much of that do you expect to use in your plant?

MR. WALDBY: We expect to use about 95 percent of it.

MR. KRON: Incidentally, when we were talking about plant fuel, the satellite plants in the way of fabrication were not included in Mr. Waldby's testimony.

CHAIRMAN MOORE: I don't know whether you care to

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answer this or not, how much in volume in barrels a day does your actual petrochemical represent, is that over 50,000?

MR. WALDBY: I would have -- I will figure it if you will go to another question.

CHAIRMAN MOORE: You may let me have it later on.

One more question, if you will. Has any consideration been given to using any percentage of your feedstock as domestic material, percentage of domestic and percentage of foreign?

MR. WALDBY: We have given serious consideration, in fact Mr. Keeler had a study made recently on the possibility of domestic material as feedstock for this project and it literally throws it out of any possibility of ever being considered as the basis of U.S. feedstock.

CHAIRMAN MOORE: I believe then that we are going to take a break for lunch. I might add here that we have a cafeteria downstairs. We are going to recess for one hour, until a quarter of two. You are all welcome to use the cafeteria downstairs in the basement of the building.

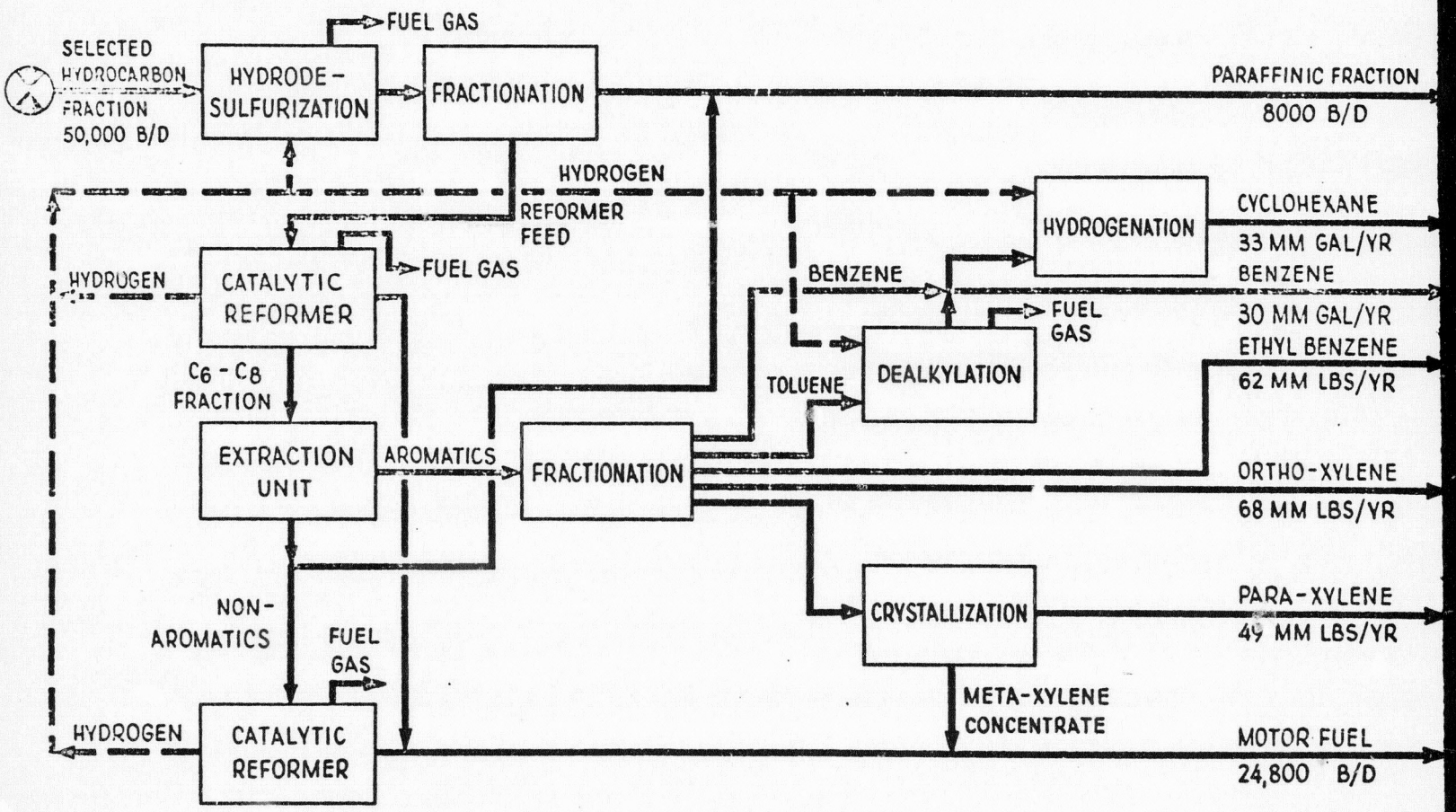
(Thereupon, at 12:45 o'clock p.m. the hearing was recessed to reconvene at 1:45 o'clock the same afternoon.)

J-54, Phillips' Exhibits presented to Oil Import Administration, July 31, 1964

E 623

PHILLIPS PETROLEUM CO. EXHIBIT 1

PETROCHEMICAL INDUSTRY FOR PUERTO RICO
PROPOSED INITIAL PETROCHEMICAL OPERATIONS



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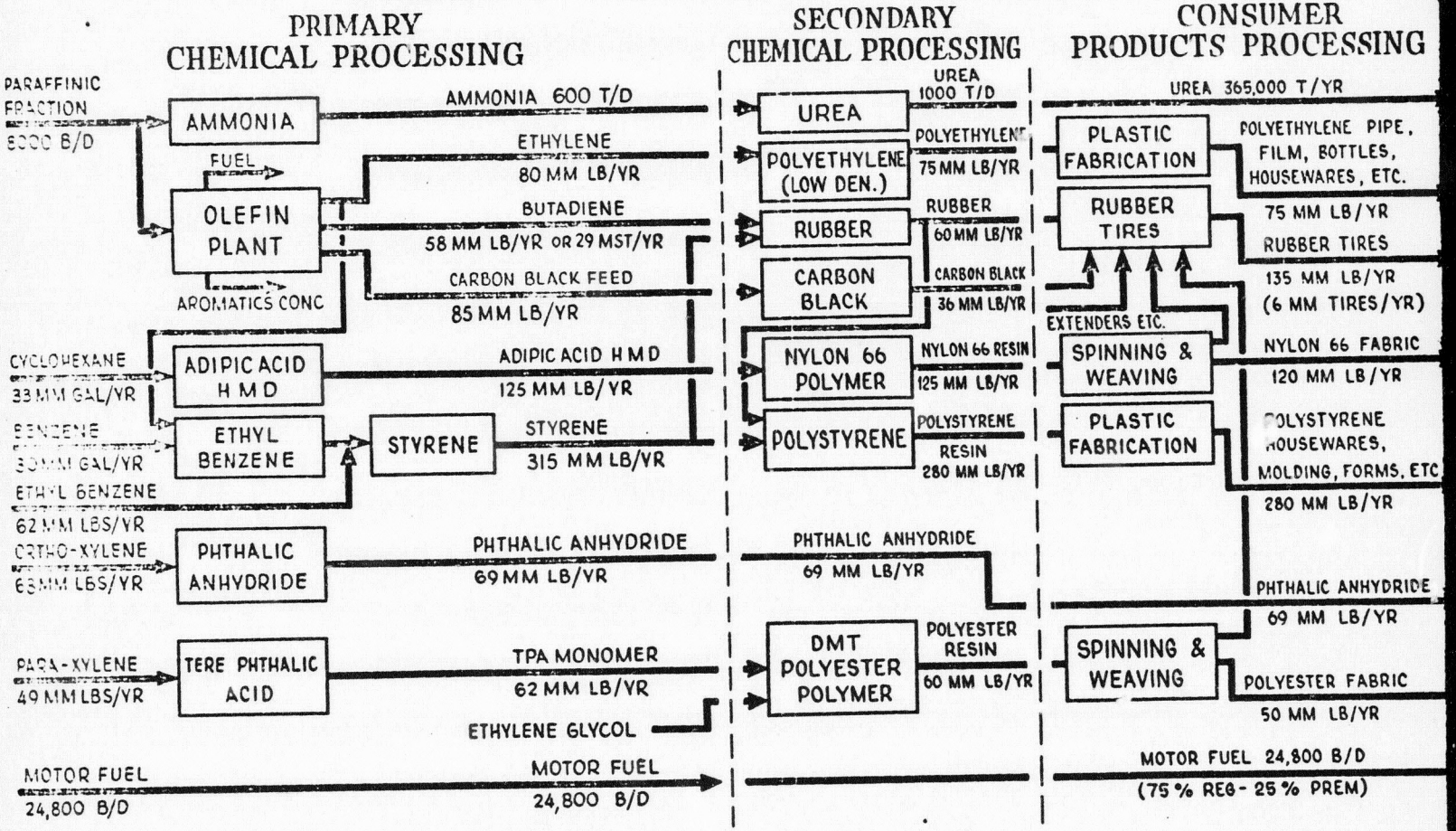
J-54

E 624

PHILLIPS PETROLEUM CO. EXHIBIT 2

POSSIBLE FUTURE PETROCHEMICAL & PLASTICS PROCESSING OPERATIONS



E 624

5-54

E 625

PUERTO RICO PETROCHEMICAL COMPLEX
ESTIMATED INVESTMENT & MANPOWER REQUIREMENTS

PHILLIPS PETROLEUM CO. EXHIBIT 3

	INVESTMENT ($MM)	MANPOWER
CORE PETROCHEMICAL COMPLEX	45.0	400
PRIMARY CHEMICAL PROCESSING UNITS		
AMMONIA PLANT	8.0	60
OLEFIN PLANT	15.3	150
ADIPIC ACID-HMD PLANT	43.0	200
ETHYL BENZENE-STYRENE PLANT	9.3	60
TEREPHTHALIC ACID PLANT	7.4	70
PHTHALIC ANHYDRIDE PLANT	9.8	70
SUB-TOTAL	92.8	610
SECONDARY CHEMICAL PROCESSING UNITS		
UREA PLANT	8.0	130
POLYETHYLENE PLANT	18.0	115
RUBBER PLANT	6.3	125
CARBON BLACK PLANT	5.8	50
NYLON 66 POLYMER PLANT	24.4	1050
POLYESTER POLYMER PLANT	15.0	175
POLYSTYRENE POLYMER PLANT	18.8	200
SUB-TOTAL	96.3	1845
CONSUMER PRODUCTS UNITS		
POLYETHYLENE FABRICATION PLANT	6.7	1550
POLYSTYRENE FABRICATION PLANT	13.3	3950
NYLON 66 MELT SPIN FIBER PLANT	80.0	3200
POLYESTER MELT SPIN FIBER PLANT	33.6	600
NYLON 66 & POLYESTER CONSUMER PRODUCTS, FINISHED FABRICS, & UNFINISHED GREY GOODS	200.0	18000
RUBBER TIRE PLANT	30.0	3100
SUB-TOTAL	363.6	30400
TOTAL POTENTIAL INVESTMENT	597.7	
TOTAL POTENTIAL DIRECT EMPLOYMENT		33,255

E 625

E 626

PROJECTED SCHEDULE OF FINANCIAL OPERATIONS IN PUERTO RICO
(MILLIONS OF DOLLARS)

PHILLIPS PETROLEUM CO.
EXHIBIT 4

YEARS AFTER PROJECT APPROVAL	1	2	3	4	5	6	7	8	9
OPERATING RATE, % CAPACITY									
CORE COMPLEX	0	0	50	75	90	100	100	100	100
PRIMARY CHEMICAL PROCESSES	0	0	0	0	0	50	75	90	100
ADDED CHEMICAL PROCESSES	0	0	0	0	0	0	0	0	0
INVESTMENT ADDED	20.0	25.0	0	12.0	14.6	0	0	13.0	15.4
INVESTMENT @ YEAR END	20.0	45.0	45.0	57.0	71.6	71.6	71.6	84.6	100.0
WORKING CAPITAL ADDED	0	10.0	3.0	3.0	3.0	1.1	1.1	0	3.5
WORKING CAPITAL @ YEAR END	0	10.0	13.0	16.0	19.0	20.1	21.2	21.2	24.7
TOTAL CAPITAL @ YEAR END	20.0	55.0	58.0	73.0	90.6	91.7	92.8	105.8	124.7
PRE-START-UP & START-UP EXPENSE	0	1.0	0	0	0.6	0	0	0	0.6
CASH FLOW BEFORE INTEREST & INCOME TAX	0	0	5.7	11.4	14.8	20.3	23.4	25.3	25.8
INTEREST CHARGES	0	0.8	2.2	2.6	3.0	2.9	1.9	0.7	0
CASH USED FOR LOAN REPAYMENT	0	0	3.5	8.8	11.8	17.4	21.5	11.6	0
CASH REINVESTED	0	0	0	0	0	0	0	13.0	18.9
CASH TO INCOME TAX & DIVIDENDS	0	0	0	0	0	0	0	0	6.9
NEW LOANS REQUIRED	0	36.8	3.0	15.0	17.6	1.1	1.1	0	0
OUTSTANDING LOANS @ YEARS END	0	36.8	36.3	42.5	48.3	32.0	11.6	0	0
EQUITY CAPITAL	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

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PHILLIPS PETROLEUM CO. EXHIBIT 5

MARKETING RESEARCH DATA FOR SELECTED PRODUCTS FROM PROPOSED PUERTO RICAN COMPLEX

PRODUCT	ANNUAL UNITS	1964 WORLD CAPACITY	1966 WORLD CONSUMPTION	PUERTO RICAN PLANT OUTPUT AS % OF 1966 WORLD CONSUMPTION	WORLD ANNUAL GROWTH RATE %	WORLD ANNUAL GROWTH VOLUME	PROPOSED CAPACITY IN PUERTO RICO	PHILLIPS CAPACITY* OR SALES
CYCLOHEXANE	MM GAL.	314	390	8.5	12	40	33	98
BENZENE	MM GAL.	1,260	1,080	2.8	6	60	30	22
ETHYL BENZENE	MM LBS.	3,800	4,100	1.5	8	320	62	
ORTHO XYLENE	MM LBS.	1,030	770	8.8	7	50	68	
PARA XYLENE	MM LBS.	800	750	6.5	8	50	49	
AMMONIA	M SHORT TONS	23,000	25,000	0.9	9	200	219	707
BUTADIENE	M SHORT TONS	1,850	1,700	1.7	5	80	29	115
ADIPIC ACID-HMD	MM LBS.	—	1,030	12.1	10	100	125	
STYRENE	MM LBS.	3,560	3,910	8.1	8	300	315	
PHTHALIC ANHYDRIDE	MM LBS.	1,470	1,490	4.6	6	90	69	
TEREPHTHALIC ACID	MM LBS.	850	770	8.1			62	
UREA	M SHORT TONS	5,300	5,500	6.6	8	400	365	80
POLYETHYLENE	MM LBS.	5,090	6,600	1.1	17	800	75	194
SYNTHETIC RUBBER	M LONG TONS	3,270	2,900	0.9	5	140	27	101
CARBON BLACK	MM LBS.	4,200	3,000	1.2	5	150	36	455
NYLON SALT	MM LBS.	1,670	2,000	6.3	10	200	125	
POLYSTYRENE RESIN	MM LBS.	2,060	2,530	11.1	9	200	280	
POLYESTER FLAKE	MM LBS.	650	940	6.4	9	80	60	
TIRES	MM UNITS	310	330	1.8	5	15	6	1
PLASTIC PRODUCTS	MM LBS.						355	UN-DISCLOSED

*INCLUDES EXPANSIONS IN PROGRESS

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